

NETWORK WORLD

The Newsweekly of User Networking Strategies

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GM presses ISDN group for action

By Tom Smith
New Products Editor

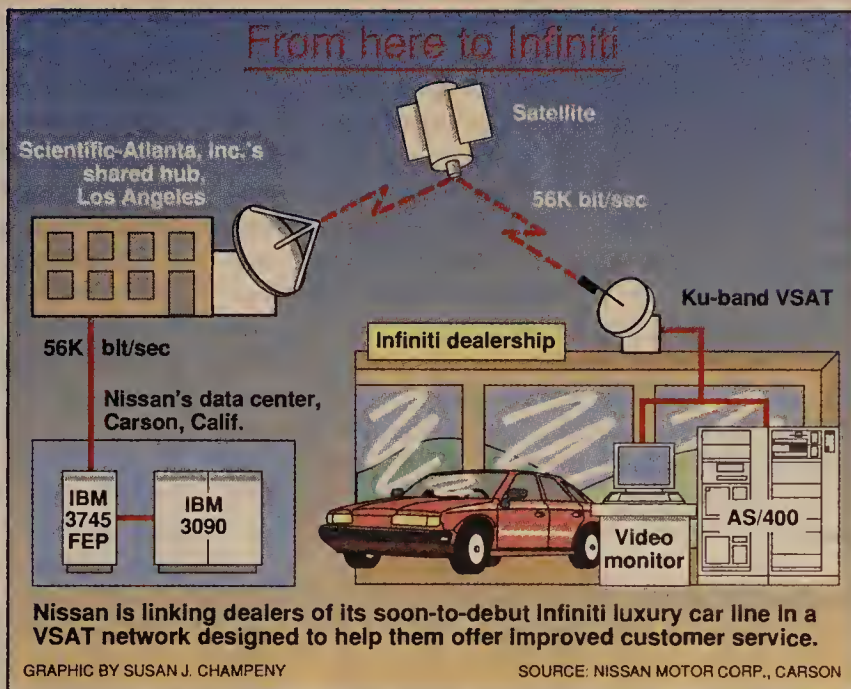
PHOENIX — General Motors Corp. said it is reevaluating its participation in the North American ISDN Users' (NIU) Forum after the group failed to make progress last week on setting up a proposed ISDN interoperability event.

At the beginning of the NIU Forum meeting, Karl Schohl, a senior project engineer with GM's advanced engineering staff in Warren, Mich., laid out three objectives GM wanted the NIU Forum to achieve during the week.

GM called for establishment of a publication date for so-called Integrated Services Digital Network implementor agreements and progress on technical details regarding the interoperability event. It also sought a decision on GM's proposal that the multivendor ISDN event be staged by Southwestern Bell Telephone Co.

The multivendor ISDN event is intended to demonstrate interoperability among vendors' ISDN products and services. The NIU Forum has yet to decide when or where the event will be held.

By a GM-imposed Thursday deadline, the group had acted on the company's first two demands
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Nissan builds VSAT net to support Infiniti car launch

Automaker sets up Ku-band satellite network to link dealers nationwide to main data center.

By Bob Brown
Senior Editor

CARSON, Calif. — Ready for the rollout of its ballyhooed Infiniti luxury car line, Nissan Motor Corp. is building a nationwide VSAT net designed to help Infiniti dealers provide top-notch customer service.

Nissan will make its heralded entrance into the luxury car market on Nov. 8 with the introduction of Infiniti models Q45 and M30. The car maker has been promoting the \$38,000 vehicles through an unusual advertising

campaign that has yet to give prospective buyers a glimpse of the car (see photo, page 14).

As the Infiniti launch draws near, Nissan is moving forward with installation of a Ku-band very small aperture terminal network that will link minicomputers at Infiniti dealerships to the company's data center here.

Dealers will upload sales and inventory data to the central site, and will be able to access price updates, car owners' service histories and information about the
(continued on page 14)

IBM reveals NetView graphic interface plan

Plans early '90 intro of homegrown graphical interface; outlines strategy for wider APPN role.

By Paul Desmond
Senior Writer

RALEIGH, N.C. — IBM last week briefed analysts on its plans to announce early next year a homegrown graphic interface to NetView and discussed its strategy for incorporating APPN into mainframe-based SNA networks.

The graphic interface revelation comes just two months after IBM announced the acquisition of US West Network Systems, Inc.'s NetCenter, a graphical NetView interface package ("IBM refines NetView, closes Siemens deal," NW, Aug. 21).

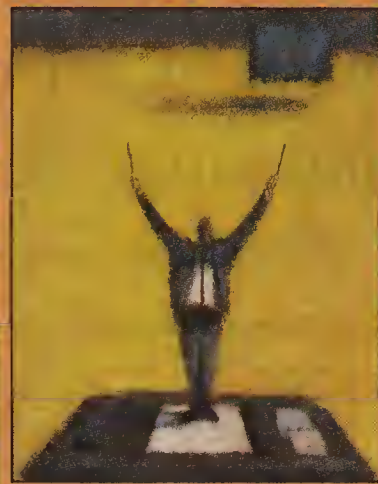
While that turnaround surprised analysts, they were less taken aback by IBM's admission that it faces a major development effort to bring Advanced Peer-to-Peer Networking to mainframe-based Systems Network Architecture nets. Most analysts left the meeting believing it will be at least two years before full-blown APPN-type functions will be available in SNA.

The internally developed NetView interface will be based on an IBM Personal System/2 running OS/2 Extended Edition, according to Atul Kapoor, vice-president of Kaptronix, Inc., a consul-

tancy in Haworth, N.J.

The interface, which will use IBM OS/2 Presentation Manager, is in alpha test at IBM, said Kapoor, who attended the briefing. The interface is scheduled to be
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INSIDE



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MCI slaps AT&T with false ad suit

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Escalating the already bitter public relations war in the long-distance market, MCI Communications Corp. last week sued AT&T for false advertising, labeling AT&T's ads deceptive.

In recent months, the major carriers have been blasting each other in strongly worded print and broadcast advertisements. William McGowan, MCI chairman and chief executive officer, said the situation had become so bad MCI had no choice but to file a lawsuit against AT&T "to put an end to the torrent of lies, misstatements and distortions."

In its suit, filed in the U.S. District Court for the District of Columbia, MCI seeks monetary damages for lost business under a law known as the Lanham Act,
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NETLINE

NORTHERN TEL UNVEILS a line of high-capacity switching products based on the emerging SONET standard. Page 2.

MASSACHUSETTS DECIDES to merge voice and data to cut costs. Page 2.

AT&T JOINS BOCS in first SS7 trial. Page 2.

DEC'S NEW ALL-IN-1 client/server version is ready to go

head-to-head against IBM's OfficeVision. Page 4.

BAYNAN ENHANCES VINES operations by 50%. Page 5.

UNITED TELECOM combines its local service and US Sprint operations to trim management fat. Page 5.

CALIF. PUC DROPS rate-of-return regulation in favor of incentive-based plan. Page 7.

FEATURE

Trouble is brewing in LAN server land

By John Hunter
Contributing Editor

Companies shopping for LAN servers have been deluged with conflicting information this year. For example, some users have been led to believe that Microsoft's LAN Manager and IBM's LAN Server have no provision to block unauthorized alteration or copying of data base information. Microsoft and IBM, however, say differently.

In addition, Novell's Net-

Ware has come under fire for its lack of domain addressing. However, there are differing opinions as to how serious that problem is.

And on the operating system front, supporters of OS/2 and proponents of Unix continue to wage war over which is the better system for server applications.

OS/2 supporters say it has the edge in terms of user-friendliness. On the other side, Unix proponents are
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Northern Telecom offers SONET-compatible wares

Family of Synchronous Optical Network products support transmission rates from 45M to 2G bit/sec.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Northern Telecom, Inc. last week introduced a line of transport and switching products for public and large private network users that support the emerging Synchronous Optical Network (SONET) standard.

The FiberWorld product line includes a SONET-compatible extension of the company's DMS SuperNode central office switch and products for the transport and delivery of SONET-based services.

SONET defines standards for fiber-optic communications at transmission rates ranging from 45M bit/sec T-3 speeds up to more than 2G bit/sec. Channel rates are multiples of the stan-

dard 1.544M bit/sec T-1.

Northern Telecom expects the products will be implemented initially by local and long-distance carriers to improve network efficiency and provide enhanced services to users.

Some of these services include dial-up videoconferencing, local network bridging at local net speeds and switched multimegabit data services.

Awesome

Joaquin Gonzalez, partner at Ernst & Young's Network Strategies practice in Fairfax, Va., called the SONET-based line "awesome stuff."

While fiber increases capacity in the network, "the implementation of SONET interfaces makes it

(continued on page 5)

Mass. gov't combines data and voice nets to cut costs

T-1/T-3 net may save up to \$1 million per year.

By Wayne Eckerson
Staff Writer

BOSTON — Network managers for the state of Massachusetts are reworking plans for a statewide data network due to a legislative mandate to merge voice and data departments.

The directive has network managers exploring ways to integrate voice traffic from more than 200 private branch exchanges and key systems, as well as a statewide Centrex system that supports more than 7,000 users, onto a proposed T-1 data

backbone. The state's decision was motivated by the need to slash spending to help balance a large fiscal deficit.

Consolidating the state's voice and data facilities reverses a plan first conceived two years ago that called for the implementation of a data backbone. Nevertheless, the changes could be a blessing in disguise, according to Len Evenchik, director of data communications for the Commonwealth of Massachusetts.

"The state legislature is cor-

(continued on page 6)

AT&T joins with RBHCs to test CCS7 compatibility

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T last week said it has joined Southern Bell Telephone and Telegraph Co. and South Central Bell Telephone Co. in the first Signaling System 7 (SS7) trial linking local and long-distance carriers.

AT&T will support the transmission of Common Channel Signaling System 7 (CCS7) data between a Southern Bell central office switch in Miami and a South Central Bell central office switch in Nashville. The long-haul carrier hopes the trial will help identify unforeseen differences between the companies' implementations of CCS7, according to

John Kauza, AT&T's ISDN/SS7 division product manager.

Linking the out-of-band signaling systems will enable the carriers to make service features such as Integrated Services Digital Network's automatic number identification more widely available, and it will facilitate provisioning of new offerings.

Out-of-band signaling systems transmit information about the call, including its origin and intended destination, over a packet-switched network that is maintained separately from the traffic-bearing network. Older in-band schemes sent signaling data in the same pipe with live traffic so each leg of the call was set up

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Briefs

No-win situation for users. Users of private branch exchanges and key systems imported from Japan and Taiwan could see prices rise 150% next year if the Department of Commerce levies duties on the imports because these countries have been dumping goods at below-market prices in the U.S. Last week, the Commerce Department completed an investigation into a dumping complaint filed by AT&T and found that three companies, Toshiba Corp., Matsushita Electrical Industrial Co., Ltd. and Nitsuko were selling products in the U.S. at prices 129% to 178% lower than in their own countries. The International Trade Commission must now determine whether the influx of these products has hurt U.S. companies. The duties would increase import prices to the prices at which the products are sold in the manufacturer's country.

Prices on other vendors' products will probably rise as well, according to Eric Nelson, a trade expert with the North American Telecommunications Association. By raising the price of the cheaper imports, other vendors will have more room to raise prices — probably around 10% to 15%, he said.

Apollo sees FDDI light. Hewlett-Packard Co.'s Apollo Division last week said it developed a controller board that will link Apollo Series 10000 workstations to a 100M bit/sec Fiber Distributed Data Interface network (FDDI).

HP said it will offer an FDDI controller board for its other workstations in the future. The controller board will enable the Apollo Series 10000 to attach directly to an FDDI backbone network and establish

peer-to-peer connections with other Apollo Series 10000s or, in the future, network servers. The controller will be available in April 1990; pricing has not been set.

At least they agree on something . . . Nynex Corp. and its two unions, the Communications Workers of America and International Brotherhood of Electrical Workers, last week agreed to mediation in an attempt to settle the 10-week strike.

In a joint statement, the three parties said: "All parties acknowledge that it is in the best interest of employees and customers to bring the strike to a conclusion as quickly as possible."

The main issue in the dispute has been Nynex's plans to shift some health care costs to employees.

C&P charges vendor favoritism. The Chesapeake & Potomac (C&P) Telephone Co. last week filed a protest with the General Services Administration alleging that the U.S. Department of Treasury unfairly favored AT&T in a bid for a digital switching system. AT&T was awarded the \$90 million contract in September and will install the digital switching system to serve 16 of the department's Washington locations.

A spokesman for Bell Atlantic Corp. said the C&P Telephone bid was \$18 million less than the AT&T proposal. C&P Telephone is asking the Board to rescind the Sept. 28 contract and award it to C&P Telephone. The Treasury Department said it believes AT&T's \$90 million system is "substantially better than the C&P proposal."

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Industry Update

After a slow start, the market for very small aperture terminal equipment and services is about to take off, as VSAT costs are challenging those of terrestrial links and users embrace the concept of shared-hub facilities. **Page 11**

Telecommunications

American Creditors Bureau, a bill collection agency, has installed two US West Communications, Inc.-provided ISDN Primary Rate Interface lines to replace 72 local access lines. **Page 17**

Data Communications

The University of Michigan will host Educom '89 this week, giving the school a chance to show off the flexibility its campuswide fiber-optic backbone provides in meeting network demands. **Page 23**

Local Networking

The recent Interop '89 exhibition included coming-out parties for several internetworking standards, but center stage belonged to the Simple Network Management Protocol, a standard net management scheme for TCP/IP networks. **Page 27**

Management Strategies

Users who think that networks only cost their companies money should consider Science Applications International, an \$865 million engineering firm. **Page 31**

Products & Services

Fibermux announces a series of bridges and routers that support the emerging Fiber Data Distributed Interface standard. **Page 33**

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DEC's new All-In-1 pack enables micros, workstations to swap data

By Jim Brown
Senior Editor

NEW YORK — As expected, Digital Equipment Corp. unveiled at the Info '89 show here last week a new version of its All-In-1 office system that enables users of disparate systems to exchange electronic mail, documents and data.

The upgraded software complies with DEC's 21-month-old Network Application Services (NAS) application development blueprint and is being positioned by the minicomputer maker as a competitor to IBM's OfficeVision Systems Application

Architecture-compatible software ("DEC preps for EMA, All-In-1 product blitz," *NW*, Oct. 9).

Under All-In-1 Phase II, the company redesigned the core All-In-1 software to work in a client/server architecture. IBM Personal Computers, Apple Computer, Inc. Macintoshes and DEC workstations running client software can access data and applications on DEC VMS-based systems running All-In-1 server software.

DEC said it will add client software for Ultrix-based workstations later but did not announce a timetable for supporting other

Unix-based devices.

The client software supports either a menu-driven or a graphical user interface. Both the client/server architecture and graphical user interface are departures for DEC. Previously, only DEC terminals or microcomputers emulating DEC terminals could access All-In-1 applications on a VAX. Devices running All-In-1 client software can be directly attached to the All-In-1-equipped VAX or linked via a DECnet-based Ethernet or an X.25 connection.

DEC also said last week it will make a version of the E-mail component of All-In-1 available as a separate product.

Lastly, DEC said 13 software developers, including Lotus Development Corp., Ashton-Tate Corp. and Information Builders, Inc., are building NAS-based applications that will work with All-In-1 Phase II.

These applications, called Business Intelligence applications, will be able to access and incorporate data stored in a common format on a VAX running All-In-1.

Business Intelligence applications can also use data access services running on All-In-1 servers to access data managed by DEC's VAX-based Rdb data base management system or IBM's DB2 DBMS.

DEC officials acknowledged All-In-1 Phase II is its first line of defense against IBM's OfficeVision software, which runs across the full range of IBM processors and is designed to make it easier for users of different IBM systems to share data.

"All-In-1 Phase II is a better product for users than OfficeVision because of its openness," said John Logan, vice-president of the Aberdeen Group, Inc., a market research firm in Boston.

Others said DEC may have an edge over IBM because it is closer to shipping products. "DEC still has a lot of development to do on it. But they are close to delivering products that actually allow people to sit at different devices and interact," said Howard Niden, manager of consulting services in Price Waterhouse's Pittsburgh office.

Among the software products DEC announced last week were:

- All-In-1 Version 2.4 for VMS — server software that supports such functions as file sharing, calendaring, E-mail and word processing for All-In-1 clients. A VMS-based release will be available in January at prices ranging from \$2,495 to \$137,356. DEC said it will develop Ultrix-based All-In-1 server software later.

- All-In-1 Starter Version 2.4 for VMS — server software that supports the core All-In-1 services at half the cost of the full-blown package. The package costs between \$1,248 and \$68,678 and will be available in January 1990.

- All-In-1 DESKtop for MS-DOS — client software for MS-DOS-based microcomputers that features a menu-driven user interface. It costs \$195 and will be available in January 1990.

- All-In-1 DESKtop for VMS DECwindows — client software for DEC VMS-based workstations. The software supports a DECwindows graphical user interface, is priced at \$395 and is scheduled to ship in July 1990.

- All-In-1 DESKtop package for VMS DECwindows — which includes DECwindows-based client software and integrated applications such as DECwrite word processing and DECdecision software, which lets users extract data from multiple sources and display it on a single screen. The \$2,195 package will be available in July 1990.

- All-In-1 Mail Server — a stand-alone E-mail package running on VMS-based VAXes. The server works with All-In-1 Mail for MS-DOS and All-In-1 Mail for VMS DECwindows client software. Server software is bundled with either Message Router software or Message Router X.400 software. All-In-1 Mail Server pricing starts at \$500, and client software costs \$50. All-In-1 Mail Server and client software will be available in January 1990.

DEC said All-In-1 Phase II will continue to support DEC terminals. IBM 3270 terminals connected to DECnet-attached DEC-server 550 terminal servers supporting an optional protocol converter board will also be able to access All-In-1 servers.

DEC also said it will release client software for Macintoshes and OS/2 Standard Edition-based IBM Personal System/2s by November 1990. The Macintosh version will support a Macintosh user interface, and the OS/2 Standard Edition version will support IBM's Presentation Manager. ■

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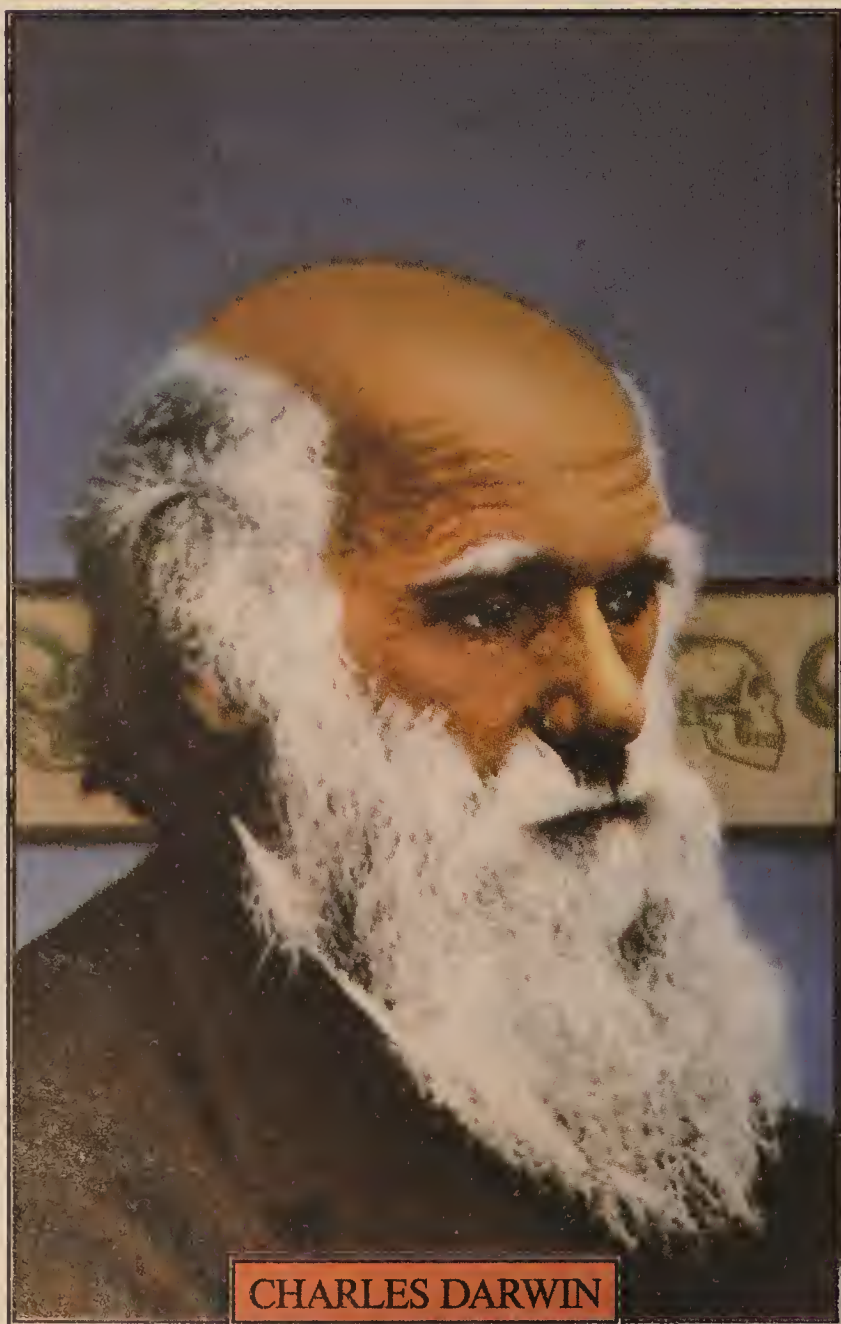


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CHARLES DARWIN

Charles Robert Darwin, English naturalist, 1809-1882. His books *On the Origin of Species* and *The Descent of Man* established the principle of natural selection, and became the foundation of evolutionary theory for the next 100 years.

Photograph: The Bettmann Archive

See the FAXNET Form on Page 75

United Telecom realigns US Sprint, Telenet units

By Bob Brown
Senior Editor

KANSAS CITY, Mo. — United Telecommunications, Inc. last week announced a corporate reorganization that more closely aligns its local telephone business with its US Sprint Communications Co. long-distance company.

By eliminating redundant op-

chairman for US Sprint.

The company also named new executives to head up its local service and long-distance companies. Curtis Fields was elected president of United Telecom's local telecommunications division, which operates telephone companies in 17 states.

Ronald LeMay was named to the newly created position of

the financial operations, data systems and information management operations, as well as legal and external affairs functions of United Telecom and US Sprint, and it named new executives to head up those posts.

The moves, which are not expected to result in layoffs, are designed to allow United Telecom and US Sprint "to operate largely as a single company," Esrey said. Furthermore, the changes will enable United Telecom "to take advantage of synergies between our long-distance and local telecommunications operations," he said.

In keeping with that push, United Telecom also merged Telenet's public data network operations into US Sprint's network operations ("US Sprint may assimilate Telenet data network unit," *NW*, July 3).

Most of Telenet's sales force will be merged into US Sprint's national accounts division and business markets group to make for "a unified front," a United Telecom spokesman said. The moves are expected to help cut costs and management fat by eliminating redundant positions and overhead, he added.

The Telenet name will remain intact as the reorganization is instituted throughout 1989, but a name change is possible after that, a Telenet spokesman said.

(continued on page 7)

The moves are designed to allow United Telecom and US Sprint "to operate as a single company."

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erations and management positions, United Telecom is aiming to cut costs, eliminate duplication of efforts and encourage customers to view the firm as a single source for local and long-haul voice and data services.

Under the reorganization, William Esrey, president and chief executive officer of United Telecom and chief executive officer of US Sprint, was elected to the additional and newly created post of

president of United Telecom's long-distance division and president and chief operating officer of US Sprint.

LeMay, who replaces Esrey as president of US Sprint, will oversee US Sprint marketing and network operations, US Sprint's public data network subsidiary Telenet Communications Corp. and Sprint Services, which includes operator services.

The company also combined

Northern Tel offers SONET wares

continued from page 2

possible to slice up the bandwidth anyway you want," Gonzalez said.

"This means you can match the capacity of the carrier network to corporate needs more easily than you could in the past. It allows carriers to give users what they want cost-effectively and quickly," he added.

And what users want is more bandwidth, said Roy Merrills, president of Northern Telecom. He said the company based its SONET strategy on input it received from Fortune 100 network users and carriers that included Ameritech, Bell Atlantic Corp., BellSouth Corp., Southwestern Bell Corp., US Sprint Communications Co. and MCI Communications Corp.

More bandwidth

"Many of these companies operating global networks for voice and data switching and transport see an immediate need for more and more bandwidth," Merrills said. "Even with the most sophisticated services available today, their networks are rapidly saturating with simple data and voice traffic."

Additionally, customers want to add high-speed graphics and image transport, videoconferencing, full-motion video and other capabilities requiring broadband transport, he said.

The FiberWorld product line

includes three main components: the S/DMS SuperNode, the S/DMS TransportNode and the S/DMS AccessNode.

The S/DMS SuperNode, available to telephone companies as an end-office or tandem telephone switch, integrates transmission and signaling functions to save telephone companies on capital expenditures.

A DMS SuperNode can be upgraded to an S/DMS switch by

dustry-standard interfaces and sub-T-1 and -T-3 switched services.

An integrated cross-connect capability enables the switch to cross-connect 64K, 1.544M or 45M bit/sec channels.

S/DMS SuperNodes can be linked over long distances using the company's new S/DMS TransportNode, which can support fiber links at speeds ranging from 600M bit/sec to 2.488G bit/sec.

The service delivery function in the FiberWorld product family is provided through the S/DMS

"This means you can match the capacity of the carrier network to corporate needs more easily than you could in the past. It allows carriers to give users what they want cost-effectively," Gonzalez said.

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adding hardware, the company said.

S/DMS switches support the standard features of the DMS SuperNode, including digital residential and business services, while adding support for a range of on-demand narrowband or wide-band transmission services for voice, high-speed data or full-motion video.

In an end-office configuration, the switch can support more than 150,000 subscriber lines, in-

AccessNode, which supports narrowband, wideband and broadband services.

AccessNodes consist of two main components: a Fiber Central Office Terminal that can be interfaced to digital or analog switches and a Remote Fiber Terminal, which is located near the customer and can support fiber or copper subscriber loops. A single Fiber Central Office Terminal can support as many as four remote terminals via fiber links.

New VINES speeds net operations

By Laura DiDio
Senior Editor

WESTBOROUGH, Mass. — After months of parceling out selected tidbits about enhancements in Version 4.0 of its VINES network operating system, Banyan Systems, Inc. is set to release full details next week.

Among the enhancements in VINES 4.0 is a revamped StreetTalk Global Naming Facility that speeds up network operations 50% compared with Version 3.0, according to Dave Penzias, Banyan's manager of software product marketing.

The company also added X.29 protocol support, four foreign languages and IBM connectivity enhancements.

VINES 4.0 is the first major upgrade to the network operating system since 1988, although Version 3.10, announced earlier this year, included enhancements such as support for 16M bit/sec token-ring networks and support for a wide range of MS-DOS-based local nets.

Penzias said Banyan is committed to getting Version 4.0 out before the end of the year; it will cost the same as Version 3.0 — \$4,995.

The 50% gain in throughput in VINES Version 4.0 is the result of improvements to the StreetTalk Global Naming Facility and en-

hancements to the server's file request scheduling algorithms, Penzias said.

The StreetTalk Global Naming Facility gives a unique name to every network device and user, enabling users to share resources such as disk drives, printers and data bases on an enterprisewide basis.

Users need only know a particular resource's name, not its location on the network.

Banyan has retooled the underlying algorithms in StreetTalk to minimize updating traffic. VINES servers use the algorithms to exchange information about network configuration, routing

VINES 4.0 is the first major upgrade to the network operating system since 1988.

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and the StreetTalk directory, according to Dan Pettengill, a Banyan product manager.

"Even if no users are logged on the network, there is still continual background traffic from servers," Pettengill said.

Reducing the amount of communications between servers reduces network overhead by as much as 65%, leaving that much bandwidth free for users' data transmissions. "Users can call up applications and request and save (continued on page 73)

Of the three products, the S/DMS TransportNode will be released first, in early 1990. The S/DMS SuperNode and the S/DMS AccessNode will be released in 1991.

John Taylor, group vice-president of transmission at Northern Telecom, said together these products can lead to dramatic network simplification. The need for products such as traditional main distribution frames, cross-connects, various stand-alone multiplexers, special service circuits, overlay networks for private-line T-1 and T-3 services and analog switches are eliminated.

"Fundamental incompatibilities between vendors, and therefore, between networks or between carriers, are [also] removed," he said.

Northern Telecom has invested more than \$250 million in its SONET technologies so far, and it expects to spend another \$200 million in 1990, said Paul Stern, vice-chairman and chief executive officer of Northern Telecom, Ltd. FiberWorld products provide networking technology "with sufficient capacity, flexibility and dependability to shatter the limits of today's networks," he said.

Some analysts, however,

question if the demand really exists for all the bandwidth FiberWorld has to offer. "I don't really see the market being that desperate [for capacity] yet," said Ross O'Brien, associate at Pyramid Research, Inc., a market research firm based in Cambridge, Mass.

Although potential high-bandwidth applications such as high-definition television and dial-up video exist, "these are not very standard items in the corporate workplace yet," he said.

Peter Bernstein, senior analyst at Probe Research, Inc. in Cedar Knolls, N.J., disagreed. "We are in an information-driven society. I think demand will be there if the infrastructure is there to carry it," he said.

Although Northern Telecom is marketing the FiberWorld products for both public and large private networks, most analysts agree that it will not be until the mid-1990s that the products are used in private networks.

"The concept behind [these SONET-based products] is bandwidth on demand," said Steve Sazegari, senior analyst at Dataquest, Inc. He projected that as private network users migrate to public services, they will have less incentives to purchase their own broadband capacity. ■

Mass. gov't combines nets to cut costs

continued from page 2

rect: The Commonwealth can achieve substantial savings by integrating voice and data traffic over the backbone network," he said.

According to Evenchik, states that have built similar networks have saved millions of dollars. "I feel we can do the same here," he said.

Consolidated savings

As originally planned, the high-speed data backbone, called Comm-net, would consolidate 10 separate data networks and 50 local networks, and would eliminate hundreds of overlapping leased lines.

The project called for the implementa-

tion of a dozen T-1 lines connecting about 10 network nodes across the state. State offices would access the backbone through existing analog or digital local access lines. A pair of T-1 multiplexers at each node (one serving as a backup) would route traffic to one of 10 data centers, each supporting operations for a different agency. Most of the network nodes would be collocated in one of the data centers.

Depending on traffic volumes, Evenchik said he might lease T-3 circuits to link some of the state's larger data centers, most of which are located in Boston. He is also considering using private metropolitan network facilities, microwave, infrared and some privately owned fiber lines to interconnect these downtown data centers.

Evenchik originally estimated that consolidating the state's data networks would

cut 10% to 15% off the annual expense of supporting communications lines and equipment, or approximately \$500,000 to \$1 million per year. In addition, by reducing the number of leased lines used by the state, Comm-net would save the state from having to absorb rate increases for private lines. Evenchik said New England Telephone and Telegraph Co. is expected to gain permission next year from the Massachusetts Department of Public Utilities to raise its private-line rates by as much as 30%.

Evenchik's team finished the planning phase for Comm-net last spring and then issued requests for information (RFI) to 30 vendors for T-1 equipment and services. Three weeks before the vendors returned the RFIs, the state legislature passed the 1990 Budget Act, forcing Even-

Evenchik originally estimated that consolidating the state's data networks would cut 10% to 15% off the annual expense of supporting communications lines and network equipment.

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chik and his team back to the drawing board.

Evenchik's team, which meets monthly to hash out network problems, is now talking to vendors, state agencies and consultants to explore options for integrating the state's voice traffic into Comm-net.

The team is trying to discern where and how it should expand capacity on Comm-net to support additional voice traffic, determine the most cost-effective ways to connect the variety of voice systems used by different agency offices and evaluate additional net management requirements.

"You have to be a surgeon to know what pieces can be joined to the network cost-effectively and which can't," Evenchik said. "Right now, there are no obvious solutions. I'm just trying to figure out what my options are." □

AT&T joins with RBHCs to test CCS7

continued from page 2

as it progressed through the network.

With CCS7, the signaling network checks to see if a call can be completed before setting up the call path, enabling carriers to use valuable switching and transmission resources more efficiently.

"Network management will also be improved when busy signals and network congestion announcements come from the central office closest to the caller, rather than from whatever point in the distant network is blocking the call," Kauza said.

AT&T has worked extensively with the two Bell operating companies to reduce the chances of any major problems cropping up during the field trial, which is scheduled for completion in the first quarter of 1990.

In the trial, a Northern Telecom, Inc. DMS-100 switch in Southern Bell's Miami switching center will pass signaling information to a BOC signal transfer point (STP), a Northern Telecom NT STP.

The signaling information will then be relayed through AT&T 3B20 computers serving as STPs in AT&T's CCS7 network to a small version of Ericsson's AXE switch, which South Central Bell uses as its STP. The signaling data will then be passed to a Northern Telecom DMS-100 in the BOC's Nashville switching center.

The trial is a major milestone for CCS7, which provides local and long-distance service providers with a number of benefits, according to Vince Rafferty, a principal with The Aries Group/MPSG, a Rockville, Md.-based consultancy.

"The top three long-distance carriers and several of the RBHCs are already using CCS7 to maximize the efficiency of interoffice trunking, which saves them a good deal of money. Now they're linking signaling networks with the intent of generating new revenues from new and enhanced services," Rafferty said. □

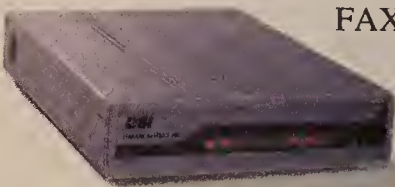
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Calif. PUC opts for rate plan based on carrier incentives

By Wayne Eckerson
Staff Writer

SAN FRANCISCO — Following a growing regulatory trend, the California Public Utilities Commission (PUC) last week voted to adopt an incentive rate plan that would supplant traditional rate-of-return regulation for local service providers.

The California PUC plan, which takes effect Jan. 1, caps annual rate increases at 4.5% below

the rate of inflation. It allows local exchange carriers to earn a 13% rate of return — 1.5% above the 1990 rate of return, which the commission had set at 11.5%. Local carriers would keep half of any profits over the 13% rate of

return and give the other half back to customers. All earnings above 16.5% would be given back to consumers.

The plan gives California's major carriers — Pacific Telesis Group and GTE California, Inc. — greater flexibility in pricing competitive services. The California PUC will continue to closely control pricing of monopoly services and ensure that revenue from such services is not used to

subsidize competitive ventures.

Similar incentive-type regulatory schemes — which combine pricing flexibility, price caps and profit-sharing — have been implemented in New York, Florida and Wisconsin, with other states currently considering such measures. The Federal Communications Commission also is planning to introduce price cap regulation for local carriers next year; it has already implemented

price caps for AT&T.

"Incentive regulation is definitely catching on," said Gail Garfield Schwartz, vice-chairman of the New York Public Service Commission.

California regulatory officials said traditional regulation does not encourage carriers to operate efficiently or contain costs, yet it involves cumbersome accounting procedures that can be manipulated.

(continued on page 74)

United Telecom realigns units

continued from page 5

"We believe this alignment will focus our commitment to data marketing, minimize our operating costs and present a consistent picture of our capabilities to the marketplace," Esrey said.

Charles Nichols, a vice-president at Prudential-Bache Securities, Inc. in Boston said, "The idea is to make it more simple for the customer to buy voice and data services at the same time."

In a move designed to cash in on the growing international and global communications market, United Telecom also announced the formation of US Sprint International Systems and Services Group in Reston, Va., where Telenet is based. Paolo Guidi, who had been executive vice-president at US Sprint and president of Telenet, is now president of the new international group.

The new group will have overall responsibility for providing international voice and private-line services, electronic messaging services and products, and turnkey data and corporate networks to both domestic and international markets.

The group, which will offer some services via PTAT, the transatlantic cable US Sprint owns with Cable & Wireless PLC, also plans to create "a Global Data Network" that will build on the company's existing overseas ties to public packet networks run by foreign telecommunications administrations.

On a roll

Separately, United Telecom last week reported a 75% jump in earnings and a 21% increase in revenue for the third quarter ended Sept. 30, thanks in large part to growth at US Sprint.

US Sprint reported net operating revenue of \$1.11 billion, up 7% over \$1.04 billion reported for the second quarter. Net income was up about 25% to \$60 million for the quarter, compared to \$48.1 million in the second quarter. For the first nine months of the year, US Sprint's operating income was \$135 million compared to a loss of \$228 million for the first nine months of 1988. ■



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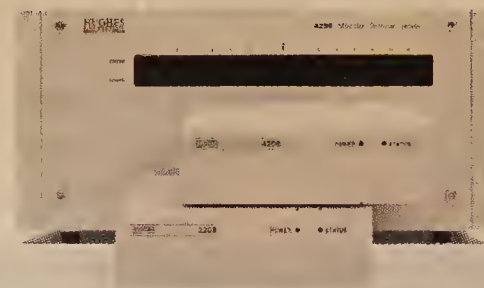
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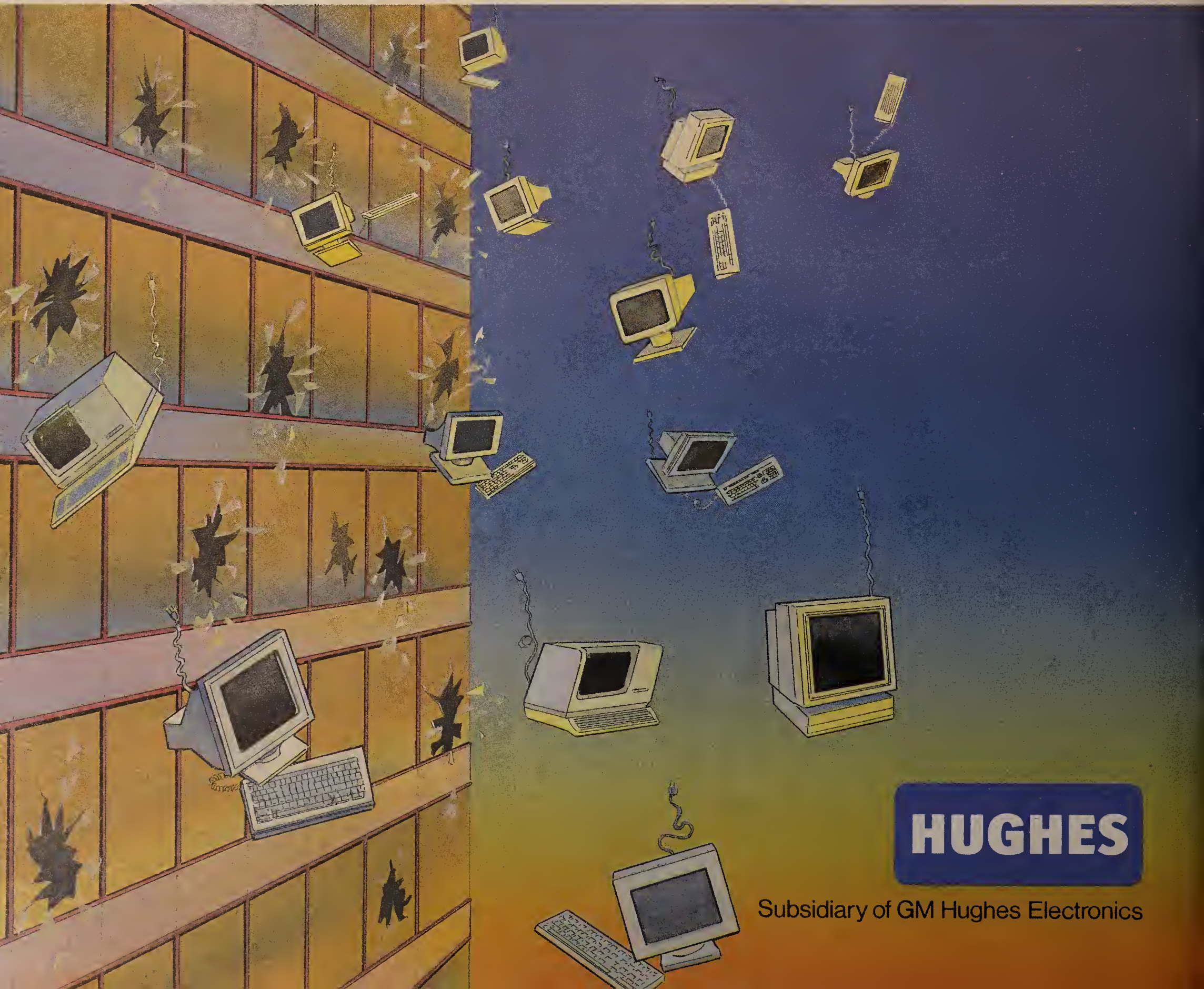
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Digital Equipment Corp. and Deloitte Haskins & Sells Co., a professional services firm, last week said they will begin to jointly offer systems integration services to users in manufacturing industries. DEC said similar agreements are being planned with other management consulting firms.

People & Positions

Voicemail International, Inc. in Santa Clara, Calif., last week named **James Thompson** vice-president for sales and marketing.

Thompson's responsibilities include overseeing the sales and marketing for Voicemail International's domestic and international service and product sales, as well as overall marketing responsibility.

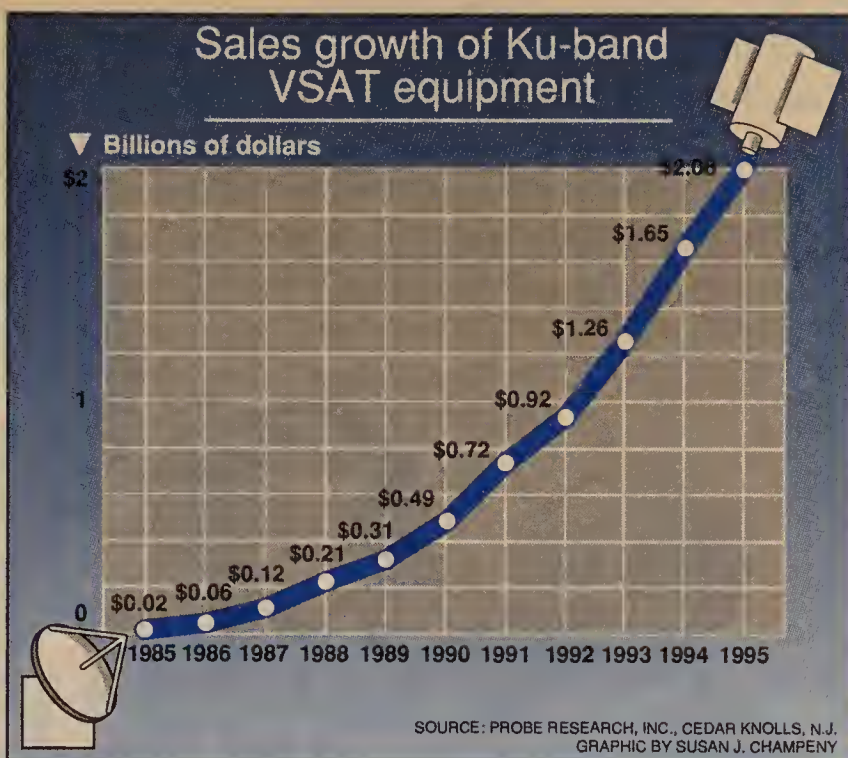
The sales and marketing post has been vacant for about two years but was held in "an acting capacity" by Alan Rossi, the company's chairman and chief executive officer, a company spokesman said.

Previously, Thompson was regional manager for IBM's Rolm Systems Division in Chicago.

Britt Healey has been appointed area director of the Western Region for **Rockwell Communication Systems**, a unit of **Rockwell International Corp.** in Richardson, Texas.

Healey's responsibilities in the newly created position include coordinating product marketing and sales strategies as the senior Rockwell Communication Systems executive for customers in the Western U.S. Previously, Healey was director of business development for Computerbase-Hyperstor Systems, Inc.

Rockwell Communication Systems sells net transmission, data communications and semiconductor products and services. ■



Local loop costs may stunt growth in TSAT market

By Bob Brown
and Gail Runnoe
Network World Staff

TSATs — very small aperture terminals that support T-1 transmission speeds — continue to represent a small portion of the VSAT equipment purchased by network users.

Falling prices for terrestrial T-1 services is the major obstacle blocking TSAT market growth, according to industry watchers and suppliers ("T-1 price war dims outlook for TSATs," *NW*, Dec. 5, 1988).

Steve Sazegari, senior industry analyst at Dataquest, Inc., a San Jose, Calif.-based market research firm, said the success of TSAT vendors may depend greatly on how much prices drop for local services.

Currently, the local loop accounts for about 30% of a T-1 line's cost. If the local loop prices drop as a result of increased competition and regulatory incen-

tives, T-1 lines will become even more desirable and TSATs, consequently, will become less attractive.

Tom Shimabkuro, director of marketing applications support at GTE Spacenet Corp. in McLean, Va., said TSATs "are not a big part of our business."

But there are several emerging areas where users are likely to consider acquiring TSATs, Shimabkuro said.

Users that take advantage of the growing availability of inexpensive fiber-optic links should consider using TSATs as a backup option at the very least, he added.

Philip Arcoria, director of satellite marketing and sales at NEC America, Inc. in Herndon, Va., said TSATs sales "are holding their own" at his company. Users most often use TSATs for network backup and extending the reach of their networks to rural sites with heavy communications needs, he said. ■

VSAT mart matures, rivals terrestrial links

Lower costs, attractive services give VSATs an advantage over land-based networks, users say.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — After a slow start, the market for very small aperture terminal equipment and services is about to take off, as VSAT costs are challenging those of terrestrial links and users embrace the concept of shared-hub facilities.

The combination of improved equipment reliability, lower costs and new, appealing services has made the technology a more attractive alternative to a broader number of users than when VSATs made their debut nearly a decade ago.

Most analysts and vendors say new, more efficient Ku-band equipment has been largely responsible for boosting user acceptance of VSATs and will almost single-handedly carry the market's growth in the years ahead (see graphic, this page).

According to Robert Shaw, director of technical research at Probe Research, Inc., based in Cedar Knolls, N.J., Ku-band VSATs are more suitable for many data network applications because they are less susceptible to interference from terrestrial microwave equipment than their C-band cousins.

In addition, because Ku-band VSATs operate at a higher frequency, they can use small antennas that are easy to install, he said.

Ku-band VSAT networks are also easier to license with the Federal Communications Commission, Shaw said. C-band networks must receive separate licenses for each remote site, while Ku-band nets require only one license for the entire network.

George Mattingly, vice-president and director of telecommunications at First Union National Bank of North Carolina in Charlotte, N.C., said that when his company began building its VSAT network last year, "I didn't even look at C-band because of the filing mess."

Safety in numbers

First Union National Bank started looking at VSAT technology in 1986 "because private-line rates were out of control," Mattingly said.

Though the bank only operated in one state at the time and a VSAT network would not have been cost-effective, a year later, interstate banking laws changed and First Union became a five

state bank. Then VSAT technology was much more attractive.

Mattingly estimated that the bank will save \$3 million over five years by using a VSAT network instead of terrestrial leased lines. "The larger your network becomes, the more cost-effective [a VSAT network] is," he said.

First Union also got a surprise benefit from its VSAT system last month, after Hurricane Hugo roared through the region, Mattingly said. While the telephone companies were wading through miles of downed telephone lines, "our network recovered as soon as we got electricity back," Mattingly said. With the help of generators at some locations, the network was back almost immediately. In total, he said, only four of the bank's antennas needed realignment after the storm.

While such types of reliability reports have boosted user confidence in VSAT technology, Ro-

First Union looked at VSATs "because private-line rates were out of control," Mattingly said.

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berta Wiggins, senior analyst at Boston-based The Yankee Group, cited the recent availability of shared-hub facilities as an important factor in helping to make VSATs affordable for more users.

Shared hubs are vendor-owned facilities that allow users to share access to a satellite over a common earth station. Shared hubs attract users to VSATs that normally couldn't afford the \$300,000 to \$500,000 capital outlay to build their own hub.

"Shared hubs will allow smaller companies — [those] with less than 100 locations — to buy into the technology," Wiggins said.

Eddy Hartenstein, senior vice-president for network services at Hughes Network Systems, Inc., a division of Hughes Communications, Inc. that provides both shared- and private-hub VSAT services, said, "Shared hubs have had tremendous impact on us." Literally hundreds of companies with between 50 and 300 sites need to communicate electronically (continued on page 15)

INDUSTRY BRIEFS

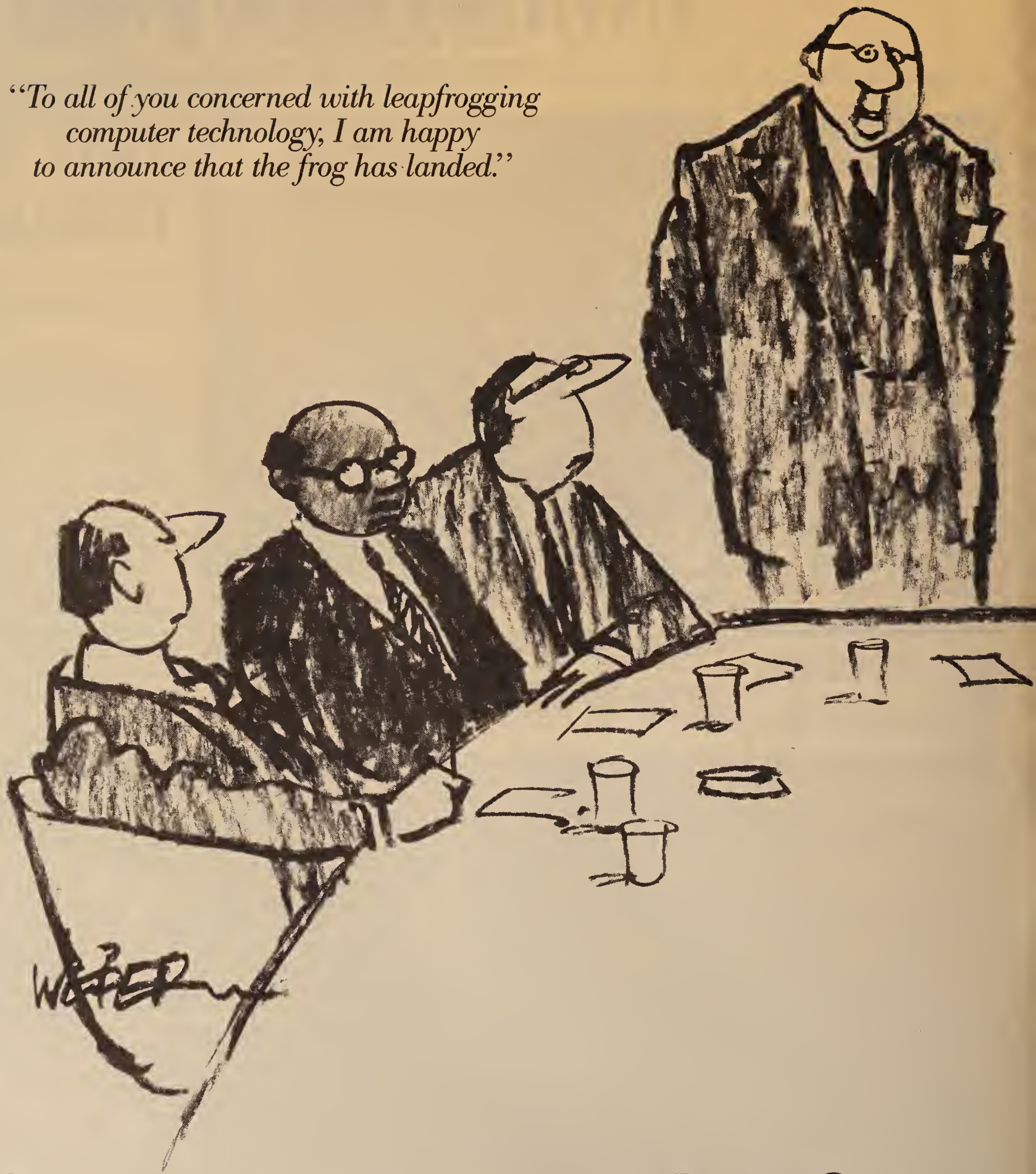
Data General Corp. last week announced a corporatwide consolidation that will eliminate about 2,200 jobs, or 15% of its work force, during the next 12 months and result in the sale of several factories.

The company said it will take an \$80 million charge against fourth-quarter earnings as a result of the cutbacks. Earnings are expected to be near the break-even point, company executives said. The Westborough, Mass.-based minicomputer maker said the consolidation was made to improve the company's operating efficiency. DG dismissed 700 employees immediately, and about 1,500 other jobs will be phased out over the next year. DG employed 14,200 workers as of last June.

DG also said demand remains strong for its MV minicomputers, and initial shipments of its Avion workstation line will pave the way for record fourth-quarter revenue.

(continued on page 15)

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VSAT supports Infiniti rollout

continued from page 1
availability of cars and parts at other Infiniti dealerships. The network will also be used for videoconferencing in the future.
Between 50 and 75 dealerships are expected to be brought onto the network this year, and more than 200 will be linked into the net over the next two years.

"We have a prestige car. We've taken the cream of the dealerships, and we want to provide a prestigious network," said Mike Hadfield, network data processing specialist for Nissan. "We want the whole experience at the dealership to be not only the selling of a luxury car, but having a comparable network there to support it."

VSATs won out over a terrestrial network because the satellite net can be set up more quickly to meet Nissan's aggressive plans for establishing Infiniti dealerships.

The network is also expected to be up to 20% less expensive than a private-line-based network, Nissan executives said. The network contract with Atlanta-based Scientific-Atlanta, Inc. will be worth about \$2 million over two years, Hadfield said (see "VSAT mart matures, rivals terrestrial links," page 11).

Infiniti dealers are being trained to use the network, as well as certified to sell the cars, at Infiniti's National Training Center in Scottsdale, Ariz. The dealers will handle Infiniti products exclusively.

“We have a prestige car. We’ve taken the cream of the dealerships, and we want to provide a prestigious network,” said Nissan’s Hadfield, network data processing specialist for Nissan.

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Nissan's point-to-multipoint VSAT network will be based on Scientific-Atlanta's SkylinX.25 products and services (see graphic, page 1). Each dealership will be equipped with an IBM Application System/400 computer that will be used by sales, service, back office and parts desk employees using terminals and personal computers. The AS/400 will be linked to a 1.8-meter VSAT terminal through a data processing unit.

The dealerships will exchange data with Nissan's main computer center at up to 56K bit/sec via Scientific-Atlanta's shared hub in Los Angeles. The shared hub links to Nissan's computer center via a dedicated 56K bit/sec circuit. The data center operates an IBM 3090 mainframe with two IBM 3745 front-end processors, one of which is reserved for backup.

Scientific-Atlanta will handle network management from Los Angeles, but Nissan will be able to monitor the network from its computer center via a 9.6K bit/sec dial-up link into the Scientific-Atlanta site. Nissan will also have the option to switch to a private hub in the future if that option becomes more economical.

Nissan is trying to distinguish dealers not only by having them provide a luxury car, but by helping them offer outstanding



Nissan's new Infiniti

service. "Nissan's intent is to lead the automotive industry with its bold, new approach to customer service and support," said Steven Nowick, president of Scientific-Atlanta's Private Networks Division.

The VSAT network provides Nissan with the flexibility it needs to open new dealerships over the next couple of years in as yet unspecified locations, Nissan's Hadfield said.

A VSAT site can be brought onto the network in a day, whereas it can take months to get terrestrial services cut over, he explained.

"You can put a VSAT dish literally anywhere in the U.S., and it's sort of a self-adjusting topology," Hadfield said. "With leased lines, you have to engineer the network and decide where this leased line is going to go and how many drops [you



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should] put on this leased line."

VSATs can prove especially flexible in the automobile dealership market, where it is not unusual for a dealership to close down on one side of town, while at the same time another is popping up on the other side of town, said John Russell, Scientific-Atlanta's manager of marketing communications.

Flexibility is also a benefit when dealers alternate using the network for batch and interactive communications, Hadfield said. The data processing units on dealer premises can be tailored for high-throughput batch transmission or high-speed interactive data communications, he said.

Future applications include access to video broadcasts, Russell said. Dealers, for example, could gain access to a special automotive dealer television network or

set up videoconferencing with headquarters to conduct meetings.

Nissan gave Scientific-Atlanta the nod over Hughes Network Systems, Inc., its second choice, for a number of reasons, Hadfield said. One was the opportunity to hand net management over to the vendor while maintaining the ability to monitor network performance. Scientific-Atlanta also allowed Nissan to buy satellite space segments in small 56K bit/sec chunks, rather than much higher bandwidths, he added.

Depending on how successful the Infiniti VSAT net turns out to be, Nissan could eventually bring 1,200 other dealerships in the U.S. onto the network, Hadfield said. Nissan might also look into using a VSAT network for internal communications if the Infiniti net proves profitable. ■

Industry Briefs

continued from page 11

Centel Corp. last week announced its agreement to buy a majority interest in **Pond Branch Telephone Co., Inc.**'s Aiken, S.C., and Augusta, Ga., cellular franchise. Terms of the agreement were not disclosed. Centel, which is based in Chicago, provides cellular service in 41 markets nationwide. Centel also provides local telephone service in nine states.

Microcom, Inc., a Norwood, Mass.-based maker of workstation software products, last week reported earnings of \$2.9 million for the second quarter ended Sept. 30, up about 66% from earnings of \$1.8 million for the second quarter last year. Revenue rose to \$17.8 million, up

25% from revenue of \$14.3 million for the second quarter last year.

James Dow, Microcom's president and chief executive officer, said sales in the company's software division were strong, with new local network bridge products selling particularly well.

Data communications equipment manufacturer **Gandalf Technologies, Inc.** last week reported that revenue for fiscal 1989, which ended July 31, was \$167.4 million (Canadian), up 5% from \$160.6 million the year earlier. Net income was \$377,000, down from \$9.4 million in 1988, which included an extraordinary gain of \$2.8 million from the sale of CASE PLC stock. Fourth-quarter revenue for 1989 was up 10% from \$42.9 million in the corresponding quarter in fiscal 1988 to \$47.5 million this year. Net income for the quarter was \$1.8 million, compared to \$597,000 in the previous year.

Cincom Systems, Inc. recently reorganized its business operations into three product-specific integrated business units in an effort to streamline the company. They include: the System Software Division, headed by Tom McLean, which includes Cincom's data base and network management systems; the Application Development Division, headed by Barry Sargeant, which oversees the Mantis application development system and related tools; and the Application Division, headed by Stan Sewall, which will govern Cincom's manufacturing and financial applications. Each business unit is accountable for its products' functionality, profitability and customer satisfaction. ■

VSAT mart matures, rivals terrestrial links

continued from page 11

cally but could not make a case for building a private hub, he said.

Hughes operates three shared hubs now and has more than 3,500 VSAT sites connected or scheduled to be connected to them. Hartenstein expects Hughes will soon have "well over 10,000 sites amongst the hubs."

Nissan goes shared route

The new Infiniti Division of Nissan Motor Corp. recently contracted Scientific-Atlanta, Inc. to link its U.S. dealerships over a Ku-band shared-hub VSAT net.

Mike Hadfield, network data processing specialist at the automaker, said he expects to save about 20% on data communications costs by using the shared hub instead of leased terrestrial lines.

Hadfield explained that it would not have been economical for Nissan to buy its own hub because of its number of sites. The company plans to open 50 to 70 dealerships this year and increase that number to 250 within two years. "For us to have gone with a private hub, we would have needed 350 to 400 sites up and running," he said.

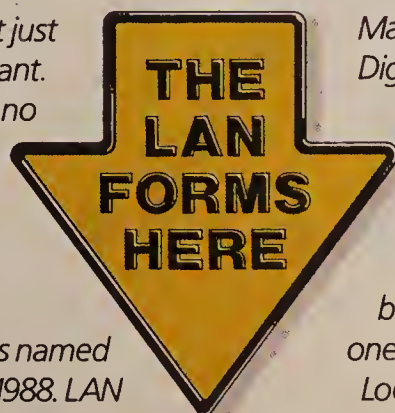
Hadfield said he wanted to take advantage of the flexibility VSATs offer. Since new dealerships will be opened across the country over the upcoming months at yet unspecified locations, it would have been impossible for the company to plan an efficient terrestrial network.

"After two years, we'd want to reengineer [the network] to be more cost-effective," he said. With a distance-insensitive VSAT network, Hadfield said, the location of additional sites will not affect the efficiency of the overall network. ■

But we're far from impartial. So don't just take our word on something this important.

Instead, take the word of those with no incentive to make outrageous claims. Like product reviews taken straight from the pages of trade pubs whose editors are rivaled in their honesty and purity only by Snow White.

For example, Electronic Buyers' News named EtherCard PLUS the Best Add-In Board for 1988. LAN



Magazine named it the Product of the Year. And PC Digest named it winner of its highest overall rating.

Naturally, all Western Digital Ethernet and Token Ring products are compatible with Novell NetWare and work lightning fast in all environments.

So if you're looking for value in network boards, visit your nearest dealer and look for the ones named most often by the trade pubs. Look for the ones named Western Digital.

WESTERN DIGITAL

See the FAXNET Form on Page 75

NETWORK WORLD • OCTOBER 16, 1989

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TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

Pacific Telecom Cable, Inc., which owns the U.S. end of the North Pacific Cable, a transpacific undersea fiber cable, said that nearly 50% of the cable's 17,010 64K bit/sec circuits have been bought by 23 carriers from 13 countries. Scheduled for completion in December 1990, the 5,200-mile cable will connect the U.S. and Japan.

Carrier Watch

Citicorp last week awarded **Overseas Telecommunications, Inc. (OTI)** a five-year contract to provide international digital satellite service for voice and data between the U.S. and three foreign countries.

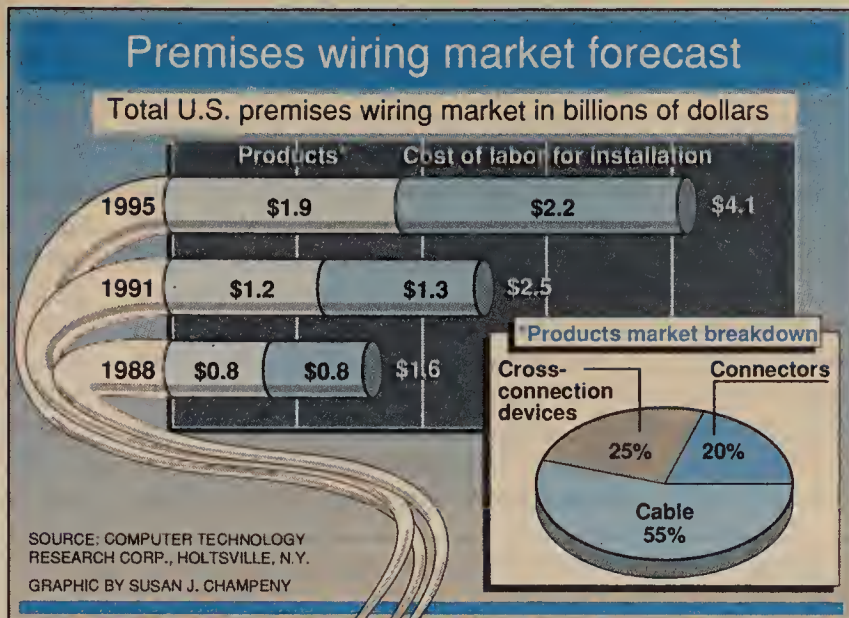
The terms and the value of the agreement were not disclosed.

OTI, an international common carrier based in McLean, Va., will provide private-line service from an 11-meter, C-band earth station located at Citicorp's Florida site to sites in Chile, Argentina and Mexico.

Under the agreement, OTI will design and install a satellite earth station for Citicorp in Mexico and will provide the transmission service to that station as well as to a Citicorp earth station located in Argentina.

A shared gateway will be used for service in Chile, and OTI is retrofitting an existing domestic earth station in Florida to carry international traffic, according to an OTI spokesman.

OTI provides digital private-line international service to more than 25 countries using satellite networks and transoceanic fiber-optic cables. ■



School tests ISDN as way to bridge local networks

University gives results of campuswide study.

Part 1 of a two-part series.

Jeffrey N. Fritz
Special to Network World

MORGANTOWN, W. Va. — Since July 1, West Virginia University has been studying ways to use the ISDN Basic Rate Interface to support the data-intensive application of bridging campus Ethernet networks.

There were several objectives in the Ethernet/Integrated Services Digital Network bridging tests. We hoped to learn how to best use ISDN links in working applications. We wondered how bottlenecks would affect file transfer performance, and we hoped to determine if additional design criteria, such as data compression, multiple link routing algorithms or filters, could help offset degradation.

Through all of this, we gained valuable insight into ISDN's performance in local network bridging applications.

In order to determine if ISDN, with its limited bandwidth, could be a candidate for local network bridging, we chose to link three major campus Ethernets. The Engineering Sciences Building (ESB) Ethernet connects a Harris Corp. minicomputer, a Digital Equipment Corp. VAX, a Sun Microsystems, Inc. Sun Server and numerous personal computers and terminal servers.

The West Virginia Network for Educational Telecomputing (WVNET) operates an Ethernet, which connects two IBM 3081X mainframes and seven VAXes. All of the internetwork traffic from the ESB Ethernet is directed through WVNET; WVNET is bridged to other departmental and college Ethernets around the

state and to the University of Maryland through a router.

Later in the test, the computer science department's Ethernet was added to the test.

Some campus Ethernets are supported by high-speed microwave and T-1 bridge links. The university is in the process of putting the College and University Financial System (CUFS) on-line, and each university department will be required to have on-line access to CUFS for administrative query purposes.

Currently, there is no campuswide backbone to support such connectivity. It is clear that for many departments, a low-cost, reliable Ethernet link to CUFS with at least a moderate transport rate is needed. We hoped ISDN could meet this criteria while providing a degree of flexibility not

We hoped ISDN could provide flexibility not commonly found in internetwork bridging.

▲▲▲

commonly found in internetwork bridging.

Let the testing begin

Last spring, we approached vendors to work with us in using a live ISDN campus facility to test Ethernet bridging. Experdata, Inc., Fujitsu America, Inc., Microcom, Inc., 3Com Corp. and Vita-link Communications Corp. offered their services as participants.

Experdata supplied us with their Vigilant Ethernet Network (continued on page 19)

Agency counting on PRI to find debtors

American Creditors Bureau hopes Primary Rate Interface will cut costs, prepare it for growth.

By Bob Wallace
Senior Editor

PHOENIX — American Creditors Bureau Cos. (ACB), a nationwide bill collection agency, has installed two US West Communications, Inc.-provided ISDN Primary Rate Interface lines to replace 72 local access lines.

ACB, US West's first Integrated Services Digital Network Primary Rate Interface customer in Arizona, said the change will enable it to support anticipated growth while reducing communications costs by 17%.

Use of ISDN will help pave the way toward the company's ultimate goal of developing ISDN-based applications that improve the efficiency and reduce operational costs of the firm's bill collection operations.

The company, based here, took the first step toward ISDN last winter when it equipped its Northern Telecom, Inc. Meridian SL-1 PBX with ISDN Primary Rate Interface software and interfaces.

That switch was linked to an

ISDN-compatible Northern Telecom DMS-100 in US West's Phoenix central office here about a month ago.

ACB's vice-president of MIS and its telecommunications manager teamed up to pitch the project to the company's president. The savings in access lines alone, estimated to be between \$500 and \$800 a month, justified the program.

"We sold the project primarily on access line savings, but we explained that ISDN would eventually give our employees flexible data-handling capabilities and position us to take advantage of future services," said Robert Freeman, ACB's telecommunications manager.

ACB was able to replace the 72 local access lines with the Primary Rate Interface links — which have 46 traffic-bearing channels — because ISDN enables the company to dynamically allocate bandwidth on the links to support various services, including 800 and direct-inward dial services.

(continued on page 18)

WASHINGTON UPDATE

BY ANITA TAFF

Georgia Pacific opts for MCI. MCI Communications Corp. last week publicly acknowledged that it has become the sole long-distance provider for Atlanta-based Georgia Pacific Corp., one of the nation's largest forest products companies. The carrier did not reveal the value of the three-year contract, but said it will provide voice, data, facsimile, 800 and credit card services through its Vnet offering for 390 Georgia Pacific locations.

MCI said it will also negotiate with communications hardware providers to obtain special deals for Georgia Pacific, which has 44,000 employees and \$9.5 billion in annual sales. MCI has already negotiated with AVDATA Systems, Inc. in Atlanta, to install 140 very small aperture terminals for the company.

The loss of such a large customer, which MCI claims has been with AT&T for 62 years, touched a raw nerve. AT&T officials have been complaining to the Federal Communications Commission for some time that regulation unfairly hampers it from competing for large corporate accounts.

Georgia Pacific told AT&T that it lost the contract because of the restrictiveness of regulation. At AT&T's urging, Paul Pavloff, senior director of information resources at Georgia Pacific, wrote a letter to FCC Chairman Alfred Sikes complaining about the regulation of AT&T. Among other things, Pavloff said AT&T lost the contract because it is unable to customize enough network deals due to regulatory restrictions and is unable to give adequate service guarantees since its tariffs must undergo FCC approval and could be rejected or changed.

A spokeswoman for Georgia Pacific said MCI was also chosen because it had better prices than AT&T. Pavloff would only say that the MCI contract would result in significant savings. ■

Economic Policy Council considers releasing RBHCs from MFJ binds

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — President Bush's closest advisors recently began debating the merits of lifting the business restrictions imposed on the regional Bell holding companies.

The Economic Policy Council (EPC), a group that includes cabinet members, the U.S. trade representative, the vice-president and the president's chief of staff, produced a paper outlining three options the administration could pursue to give the RBHCs greater market freedom.

The EPC could settle on one of the options as early as this week.

The paper said the administration's objectives are to promote a free market and encourage growth, optimize the range of information services available to consumers and formulate policies that increase global competitiveness.

If the administration decides to encourage the alteration of the Modified Final Judgment, the first option would be to support a measure similar to legislation previously introduced by Sen. Robert Dole (R-Kan.).

Dole suggested shifting oversight of the Modified Final Judgment from U.S. District Court Judge Harold Greene to the Federal Communications Commission.

One advantage of this plan, according to the paper, is that Congress might be more agreeable to shifting oversight than to dismantling the decree.

A second, similar option is to support legislation shifting oversight to the FCC but requiring additional checks and balances from executive branch agencies such as the U.S. Departments of Commerce and Justice.

The third option is to come out in favor of legislation introduced by Rep. Tom Tauke (R-Iowa) and Rep. Al Swift (D-Wash.) allowing the RBHCs to enter information services and manufacturing businesses. This change would be accompa-

nied by safeguards against cross-subsidies and predatory behavior to be administered by the FCC.

However, the administration would support this bill only if additional provisions were included. For instance, the paper suggests either prohibiting or limiting the amount of equipment that an RBHC could manufacture for its own use. Another suggested provision would require RBHCs that enter joint ventures with foreign companies to obtain assurances that the foreign countries' markets would be open to the Bell companies.

The EPC expressed concern that Congress might require the RBHCs to do all manufacturing domestically or limit foreign investment in the new ventures, both of which would be inconsistent with administration policy. ■

Agency counting on PRI to find debtors

continued from page 17

Using Primary Rate Interface to support incoming and outgoing calls lets the company gain efficiencies that were not possible when it had to dedicate access lines to specific services. Trunk-usage data generated by the PBX helps ACB determine how to best allocate the Primary Rate Interface circuits.

"We could configure channels on the two Primary Rate Interface lines to support outgoing calls during regular business hours and reconfigure them to handle incoming calls after hours," said Bob Alsaker, vice-president of MIS at ACB.

The ACB Primary Rate Interface lines run at 60% to 65% of capacity. By dynamically allocating bandwidth, ACB said it could increase the figure to 90% and still have enough capacity to accommodate high-bandwidth applications.

With the Primary Rate Interface cutover behind it, ACB is focusing its attention on developing ISDN applications that take advantage of automatic number identification (ANI). The company currently receives ANI with calls made from sites tied to the same DMS-100 central office switch that serves ACB.

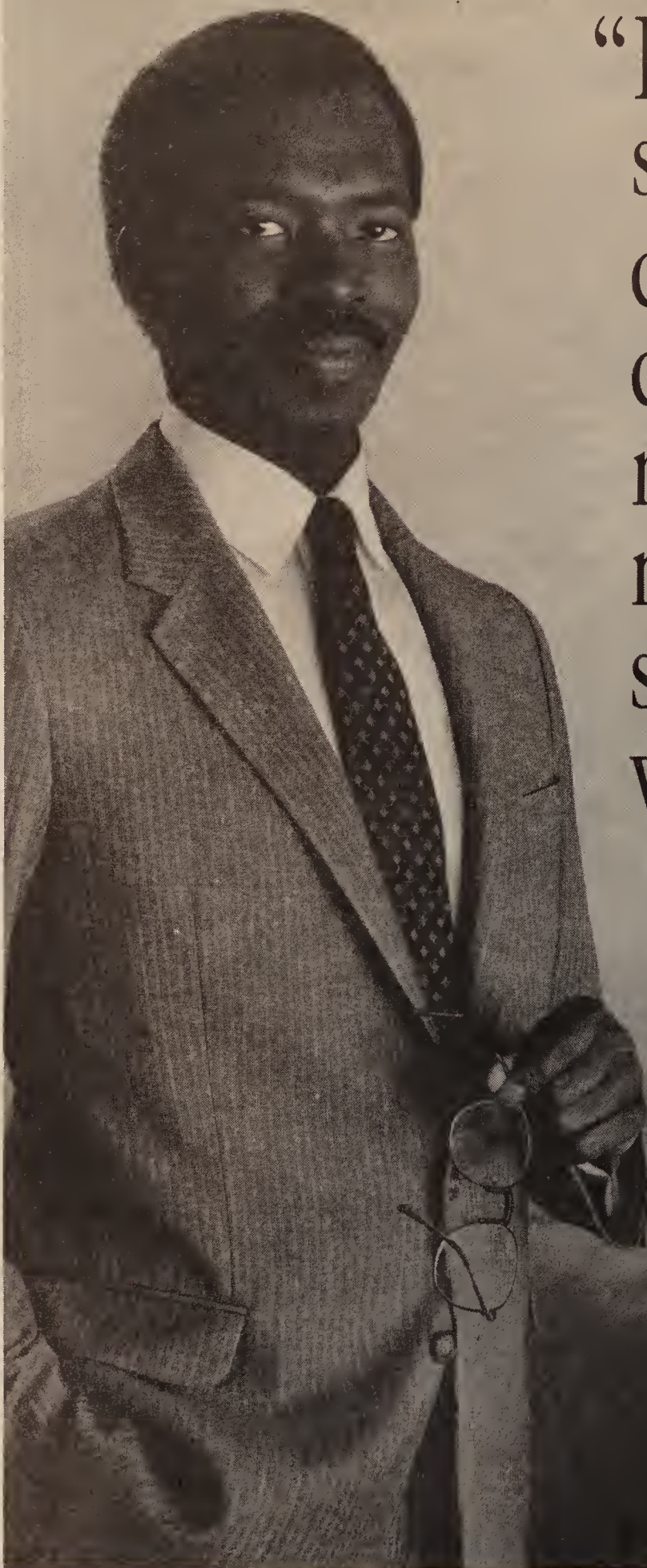
ANI will enhance ACB's bill collection process by helping agents locate people with delinquent accounts. "The most time-consuming part of the bill collection process is getting in contact with the debtor," Alsaker explained. Many debtors purposely move around to avoid paying their debts, he added.

Retailers are required by law to send debtors a notice explaining that their accounts have been passed to a collection agency. The notice contains the toll-free number of the agency that debtors can call for information and to settle the account.

ACB wants to be able to capture the ANI for each debtor who calls so it can identify callers who do not identify themselves. "Most debtors call and vent their anger at having had their account transferred to a collection agency. In a lot of cases, we don't have current information, such as their current phone number," Alsaker said.

Although ANI promises to streamline the bill collection process, it will not be widely available until US West implements Common Channel Signaling System 7 to interconnect its ISDN-capable central offices. "Right now we're an ISDN island," Alsaker said. ACB will not be able to fully utilize ISDN until ANI is delivered with local and long-distance calls. "And that's pretty much out of our control." ■

WESTINGHOUSE COMMUNICATIONS



"I found a single supplier who could help us create exactly the network we needed—not the one someone else wanted to sell us."

School tests ISDN as way to bridge LANs

continued from page 17

monitor; Microcom provided two MLB/6000 Ethernet bridges, and Vitalink supplied three Vitalink III bridges. Fujitsu provided support on their terminal adapters and interfaced with the bridge vendors when necessary. 3Com, which hasn't yet participated, is scheduled to supply gateway devices at a later point in our testing.

Initially, serial bridges with V.35 interfaces running at 64K bit/sec were used. While the serial bridges were well suited to the test environment, we were interested in the development of a dedicated ISDN bridge. Microcom is working on such an ISDN bridge and is anxious to test it because these units offer direct connectivity

and eliminate the need for an external terminal adapter.

Our first test evaluated performance with different B channel configurations. We measured throughput and link efficiency using a single B channel (64K bit/sec bandwidth), two B channels (128K bit/sec bandwidth) and four B channels (256K bit/sec bandwidth). At each point, we checked to see if the user could detect any difference between 1.544M bit/sec T-1 bridge links and the ISDN links.

Interactive users could not ascertain any difference in Ethernet link response, even when the ISDN link was heavily loaded. But there was a marked difference in throughput between the two types of links for file transfers, which was to be expected, given the limited bandwidth of ISDN.

We found that using link compression

helped, but even the most sophisticated compression algorithms could not cut too deeply into the 24-to-1 ratio between link bandwidth.

Once we obtained data on link traffic and throughput efficiency, we began to put stress on the link. It was our intention to bring the bridges and the ISDN Basic Rate Interface links to their knees.

In addition to regular link traffic over a single Basic Rate Interface line, we started 12 simultaneous file transfers between a Harris minicomputer at ESB and a VAX 780 at WVNET. We kept this up for 30 minutes.

To our surprise, the bridges and link held up well. At the peak, we moved 64,066 bit/sec to WVNET while 80,923 bit/sec came to ESB. The total aggregate throughput on the link was 144,989 bit/sec, about 113% of full-duplex capacity.

As might be expected, some packets were discarded by the bridges under very heavy loads. In the worst case, 0.4 packet/sec were discarded. This was well within Transmission Control Protocol/Internet Protocol's ability to handle, and all data eventually got through. While we saw a noticeable slowdown in throughput — all the way down to 10.3K bit/sec in one case — the link integrity was maintained.

Since an ISDN line offers two B channels, it makes sense to take advantage of the multiple parallel paths that are provided. Queuing theory suggests that routing algorithms can be utilized to balance loads on the paths. By doing this, effective link bandwidth could be nearly doubled.

The use of the Spanning Tree algorithm allowed multiple paths between bridges. This provides more efficient data routing and the additional benefit of link redundancy. The Spanning Tree algorithm seeks the most desirable path between network sections and should select an ISDN channel based on path efficiency. Besides Spanning Tree, most bridges provide filters that can be set to trap or pass packets based on protocol or source/destination address.

The Vitalink bridge offers a Single Queue Multiple Server algorithm, which Vitalink hoped would help balance the load over the ISDN links. Unfortunately, the routing algorithm did not perform well over the four ISDN B channel links.

Although the algorithm recognized that the link aggregate bandwidth was 256K bit/sec, it tended to concentrate all traffic on a single 64K bit/sec link. It wasn't until the link began to congest that the bridge routed the extra traffic through the second B channel.

Other than bridge-to-bridge handshaking, the third and fourth B channels weren't used at all. As a result, users tended to see the same restricted bandwidth.

While there is an advantage to the user seeing constant rates, the lack of load balancing wasted bandwidth. We prefer a routing algorithm that provides dynamic bandwidth to users depending on the traffic load. During periods of lower network activity, the user would receive the benefit of the additional bandwidth.

Since packets sent over parallel links may not arrive in order, the protocol used by the network must be able to reassemble packets in the correct order. Protocols such as TCP/IP can support that, but others can't. Clearly what is needed is a routing algorithm that can accomplish efficient load balancing and, if necessary, packet reassembly.

One interesting facet of the test sought to determine if triangular links could benefit link reliability. The administrators of the engineering and computer science Ethernets have wanted to configure a redundant path for their local nets for some time. We linked their Ethernets via different paths to WVNET — one directly to WVNET and the other through an intermediate Ethernet. We then simulated failures on each of the main legs to see if traffic would automatically route via the ISDN link to the other department's Ethernet and then to WVNET.

Tests were performed to verify that the bridges were selecting links appropriate to the configuration that we presented. These tests proved that ISDN could provide backup for the two Ethernets should any of the main links fail. ■

Fritz examines configuration options and the promise of packet switching on the B channel in the conclusion of this article next week.

"That really made me a hero around here."

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The ISDN

Showcasing ISDN applications

BY JEAN S. BOZMAN
CW STAFF

SCOTTSDALE, Ariz. — AT&T last week drew major computer vendors into its quest for MIS and telephone support for ISDN technology.

After years of preparation, AT&T is able to showcase Integrated Digital Network (ISDN) equipment from such manufacturers as Tandem Computers, Equipment Corp. and Wang Laboratories.

AT&T executives demonstrated

that gathers calls from multiple user locations — even those in an IBM Systems Network Architecture environment.

ISDN applications come alive at ICA

Dawn Bushaus, Assistant Editor

Vendors at the International Communications Association convention last week showcased ISDN applications history when they demonstrated a live

ISDN STEALS SPOTLIGHT AT ICA SHOW

Twenty thousand people and more than 300 exhibitors are expected at the Dallas extravaganza April 30-May 5.

More than 300 exhibitors and an anticipated 20,000 people will flock to the Dallas Center the week of April 2nd Annual ICA Conference.

AT&T To Let Telcos Offer Users Free ISDN

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Network Systems last week said it will give its telephone company customers the chance to provide their users with free ISDN service on a trial basis.

AT&T introduced its Customer Opportunity Program at last week's NetPower '89 trade show here, which featured AT&T central office equipment and third-party supplied applications for integrated services digital networks (CommunicationsWeek, March 13).

AT&T Network Systems' new program is a two-pronged offering that will let the company's Bell operating company and other telco customers introduce end users to ISDN—at

under which telcos are developing ISDN. Although AT&T's NetPower event, it was a highlight.

Robert Cooper, executive director with Rochester, N.Y., said NetPower are essential out of the labs and into Rochester Telephone interest in NetPower. AT&T SESS switchers AT&T put together are applicable to sev

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Network Systems plans to showcase 11 new ISDN applications for telephone companies and business customers at the first NetPower '89 ISDN forum here this week.

Although AT&T in the past has been involved in forums covering integrated services digital networks, NetPower '89—AT&T's own event—is different, an AT&T spokeswoman said. The company will highlight industry-specific solutions it developed in cooperation with local telephone companies and third-party vendors.

This is a way to explain to telcos and end users how ISDN centers can make the PC (local area network) more productive," she said.

Each of the 11 applications will be demonstrated in settings that depict elements typical of that environment, including customer premises equipment. The security application, for instance, will include a security guard application, a security supervisor office and a central se-

An ISDN Opportunity

EDITORIAL

AT&T, others offer w of ISDN products at d

By John Cox
Senior Editor

SCOTTSDALE, Ariz. — AT&T last week demonstrated a battery of new and existing Integrated Services Digital Network products at NetPower '89, an exhibi-

features such as Income Line Identification. \$995, the product will be available in April. NetLine, Inc.

ICA ISDN Demo: N

EDITORIAL

There was a lot of talk and, actually, a lot of action about integrated services digital networks at the International Communications Association convention in Dallas last week.

ICA ISDN showcase, Bell Telephone Co., out of ISDN technology.

the trouble to summer West Bell's integrated equipment and

At times during the Southwestern Bell technology considered the impossible work, or, at the least. Indeed, a week ago Microcom Inc. official that the AT&T SESS demo wasn't working supports ISDN at Micro. Some fine-tuning was integrated song. More than fine-tuning for the show.

AT&T To Spotlight 11 ISDN Applications

NETPOWER '89 PARTICIPANTS	
VENDOR	PRODUCT
AT&T	ISDN PC Terminal Connectivity
DEC	ISDN PC Terminal Connectivity
IBM	ISDN PC Terminal Connectivity
Intel	ISDN PC Terminal Connectivity
Microsoft	ISDN PC Terminal Connectivity
Novell	ISDN PC Terminal Connectivity
Prologix	ISDN PC Terminal Connectivity
Sequent	ISDN PC Terminal Connectivity
Sony	ISDN PC Terminal Connectivity
Tandem	ISDN PC Terminal Connectivity
Wang	ISDN PC Terminal Connectivity

AT&T spokeswoman In addition to those demonstrations, 27 v- ble products. Some for the first time at ISDN products and Prodigy Services its videorec server spokesman for the With an ISDN co- could be transmitting telephone service. Although the an ISDN switch- ing in NetPower can do "ISDN delivering our Newbridge forum to show provides net- connected the program pro- disrupting D The ISDN 150 Basic Commu- US West The li- company remove

Scorecard

(Part 2)

ity Calls

ampaign was started with little fanfare left this significant information out of both ss programs presented at NetPower ep telling consultants, the press, all the is that ISDN is here, now. With its beyond just getting the message out. The ant has put its money where its mouth is motion is a risk. The Customer Opportu- il, leaving AT&T waist-high in the ex- ISDN as trial users go back to plain old the offer ends. No matter the results, the made to telcos. If they sell ISDN, AT&T

the big users, and into the MacPower in

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The ISDN R-Se. \$995 and is avai
Other vendor to announce ISDN
terface support fr
ucts. Among them
ware Link, Inc. of
which announced

at Feat

day ISDN network creation, the driving the display must have that the demonstration wouldn't here would be glitches.
network setup was winding down, used to problems. Microcom found connected to Microcom gear in the y like the AT&T 5ESS switch that y's home base in Norwood, Mass ed to get the display humming an
be needed to get ISDN up and alon community. Part of

ations

icipating in the applications will display ISDN-compati- e products will be on display e are modifications of non- es
for example, is demonstrating an ISDN connection, a hough an ISDN company said e Plains, N.Y. company said on, he said. Prodigy's services er than with traditional plain old S) and modem connections. y has the capability to link with not done so yet, and is particip- only as an example of what ISDN only as several alternatives for st one of several alternatives said es. the spokesman said s Inc., Herndon, Va., will use this PC software package, IS-Net, which capabilities for personal computers AT&T 7500 ISDN terminal sets. The users networking capabilities without users networking capabilities without erating system operations ems at the show will be supported by interface lines provided by US West, the telephone company subsidiary of Denver.
run over intraoffice facilities from the hills SESS central office in Phoenix to a g unit located in Scottsdale, said Robert West Communications' product manager
ney rate.

Who's really putting ISDN on the map? If you've seen the headlines, you know the score.

You only have to scan the trade press to see who's the clear-cut ISDN leader. The company that helped build the standards for ISDN. The company that's helping local telephone companies turn the promise of ISDN into Real-World Solutions. The company: AT&T.

95% of ISDN lines are on an AT&T 5ESS® switch

AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—some 95% of non-trial ISDN lines. What's more, we've already shipped over 260,000 ISDN lines for future use.

Today, 162 central offices can offer operational ISDN services from the AT&T 5ESS switch—with 618 upgraded with ISDN software. Combined, these central offices have the potential to offer ISDN services to 13.5 million telephone company customers.

So, while most other suppliers are still in product development trials,

AT&T Network Systems is helping phone companies across the nation offer Real-World ISDN services right now. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail—all over a single phone line. Services that utilize your existing telephone network to dramatically increase productivity and efficiency for businesses, from hospitals and insurance companies to investment, publishing and law firms.

ISDN is just the beginning

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"IBM supports standards only after it has been bludgeoned [by users]."

Gene Hodges
Group manager
Office Information Systems
Digital Equipment Corp.
Maynard, Mass.

Data Packets

Data General Corp. recently unveiled CustomNet, a group of five programs that supports users in planning, designing, installing, integrating and maintaining nets.

CustomNet includes the CustomNet Third-Party Component Qualification Program, under which DG will resell third-party products — such as bridges, routers, gateways and modems — which it has tested to ensure compatibility with DG equipment.

Other CustomNet programs include the Cableplant Installation Management Service, whereby DG coordinates and manages site preparation and cable installation. DG will also offer a Network Maintenance Program, which includes on-site repair service, telephone software support and service to approved third-party hardware.

DG's Network Planning and Design Service will help users design nets based on considerations such as geographic scope, type of building, projected volume and anticipated growth, reliability and security. Finally, CustomNet includes a Network Integration Management Service, whereby DG manages the implementation of a local or wide-area network and supervises the integration of all DG and third-party hardware and software.

All CustomNet services are available as custom-quote or as consulting services billed on a time and expense basis.

Dynatech Communications, Inc. recently announced a new packet switch, a packet assembler/disassembler and a network management system for its CPX series
(continued on page 25)

U. of Michigan set to demo fiber flexibility

School hopes to wow Educom '89 attendees with mix of FDDI, Ethernets on show network.

By Paul Desmond
Senior Writer

ANN ARBOR, Mich. — The University of Michigan will host Educom '89 here this week, giving the school a chance to show off the flexibility its campuswide fiber-optic backbone provides in meeting network demands.

A number of separate network demonstrations will be on display at Educom, a national conference on the use of computer technology in higher education. Many of the networking demonstrations, including a Fiber Distributed Data Interface (FDDI) network that will link multiple Northern Telecom, Inc. Lanstar local nets, will use spare bandwidth on the university's 25 miles of fiber cable.

The University of Michigan recently completed the expansion of its fiber backbone, which now links 76 buildings on the school's three main campuses here, said Charles Kinney, network planning administrator for the university's information technology division.

An earlier fiber backbone linked four buildings on the school's North Campus, but the

new backbone also extends to its South and Central Campuses, blanketing the 6-mi. campus.

The fiber backbone, based on Proteon, Inc.'s ProNET-80 local network, supports links between separate but similar local nets across the campus at speeds up to 80M bit/sec. The ProNET-80 backbone supports both Digital Equipment Corp.'s DECnet and the Internet Protocol as transport protocols, said Dan Kjos, telecommunications transmission engineer manager at the school.

All for show

For the Educom show, the university is installing 22 temporary Ethernets at area hotels to support electronic mail, videoconferencing and informational updates about the show. Two additional Ethernets, based on equipment from Optical Data Systems, Inc. will link seven buildings on campus to support the same applications and vendor demonstrations.

Each Ethernet feeds into a backbone router to form a single
(continued on page 25)

Congress backs nat'l net, wants broader overhaul

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — While generally supportive of a proposed national high-speed data network, members of the House Subcommittee on Telecommunications and Finance are also calling for a broader overhaul of the nation's public telecommunications network.

A separate proposal calls for \$400 million for creation of a high-speed national network.

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Two bills before Congress — one introduced by Sen. Albert Gore (D-Tenn.) and the other by Rep. Doug Walgren (D-Penn.) — propose allocating roughly \$2

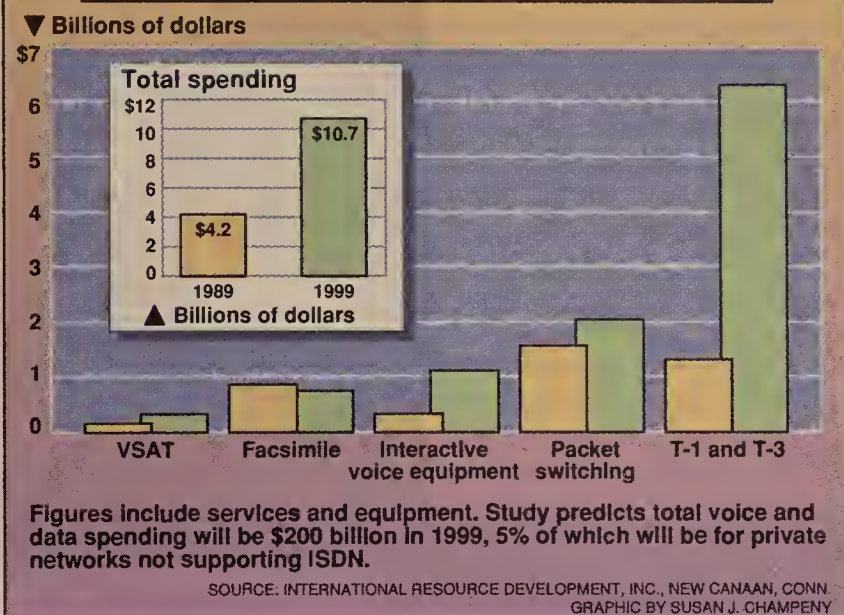
billion toward supercomputing research, part of which is to be spent on establishing a high-speed National Research and Education Network (NREN) to connect researchers at government, university and corporate laboratories.

A separate proposal, issued by the administration's Office of Science and Technology Policy, calls for \$400 million to be appropriated for creation of a high-speed national network ("Effort to build national network gains momentum," *NW*, Sept. 25).

The proposals are currently under committee review and await approval there before being offered for full congressional scrutiny. However, some NREN supporters warned that such an effort would not fulfill the needs of all the nation's advanced communications users.

Rep. Edward Markey (D-Mass.), chairman of the subcommittee and a cosponsor of the Walgren bill, called the proposed
(continued on page 26)

Non-ISDN private network spending



Report predicts private net users likely to resist ISDN

Private net advantages to outweigh ISDN pluses.

By Jim Brown
Senior Editor

NEW CANAAN, Conn. — Private data network users will not rush to the public switched network once Integrated Services Digital Network services become readily available, according to a recent report.

The report, "Non-ISDN Niche Markets in Private Networks," produced by International Resource Development, Inc. (IRD), a market research firm based here, predicts ISDN will not lure users that already have made significant investments in private networks.

Some users will continue to rely on private nets to support applications that ISDN cannot. For example, ISDN cannot broadcast data to multiple locations in a single transmission, which is why many users have turned to satellite technology.

Other needs take precedence

Some users will be more apt to invest in private network technologies that provide more tangible benefits than offered with ISDN. The report said many users today have a more immediate need for voice-messaging systems or voice-response units than they do for ISDN services.

A voice-messaging system, for instance, will enable users to support applications such as voice mail that may be more useful than ISDN's transmission capabilities.

Likewise, a voice response unit linked to a host computer enables callers to enter orders or check bank account balances by entering commands from a push-button phone, functions that can help a business more than ISDN.

ISDN may provide only limited initial benefits such as automatic number identification,

which displays the telephone number of the caller for each incoming call, the report said.

The report predicts that spending on private network services and equipment will account for \$10 billion of the nearly \$200 billion spent annually on voice and data networking in 1999 (see graphic, this page).

Currently, spending on private data networking equipment and services not supported by

ISDN may provide only limited initial benefits such as automatic number identification.

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ISDN accounts for \$4.3 billion of the \$135 billion spent annually on voice and data networking, said Ken Bosomworth, president of IRD. The report shows that private network spending in 1999 will exceed the current expectations of many analysts.

ISDN is a set of standards developed since 1979 that will enable the public-switched network to support a mix of voice and data networking currently met only by private networks.

The standard supports the Basic Rate Interface, which provides users with two 64K bit/sec B channels supporting digitized voice or data, and one 16K bit/sec D signaling channel supporting X.25 data packets. ISDN also defines a Primary Rate Interface that splits a T-1 circuit into 23 64K bit/sec B channels and one 64K bit/sec D channel.

(continued on page 26)



At this point, it's hard to tell which end of the system is in charge.

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U. of Michigan to demo fiber flexibility

continued from page 23

802.3-compatible Ethernet on the Central Campus, Kjos said. The Ethernet, in turn, is linked to both the ProNET-80 backbone and a temporary FDDI backbone built for Educom with equipment from cisco Systems, Inc.

Users attached to either backbone will be able to access numerous nationwide academic networks, such as the National Science Foundation network, to which the

a Fibronics FDDI product that links Northern Telecom Lanstars.

Eyeing FDDI

Eventually, the university expects to use FDDI as a backbone for at least some of its own applications, Kinney said. Toward that end, 30 of the 36 strands in the school's fiber-optic cable are multimode 62.5 micron fiber, the type specified by the FDDI standard. The school has yet to use the remaining single-mode fiber strands, which are better suited for transmission over long distances.

The FDDI backbone will be used for applications including file transfers, such as the massive files of image data generated

by users in the school's medical center, or large volumes of analytical data shared by users in the physics department, Kinney said. "There are single applications that may chew up some of that bandwidth, but on the backbone itself, the traffic is really an aggregation from the dozens of local-area networks," he said.

For example, the university has at least 8,000 Apple Computer, Inc. Macintoshes on numerous AppleTalk campus networks. To communicate between remote nets on campus, the school has about 60 Kinetics, Inc. FastPath bridges that encapsulate AppleTalk protocols in IP format for transport over a campuswide Ethernet supported by the fiber backbone.

The University of Michigan also supports DECnet over its 80M bit/sec fiber backbone to give users in its physics de-

partment links to nationwide networks based on that protocol, such as the High Energy Physics Network and the Space, Physics and Atmospheric Network.

An ongoing study with IBM on using a network of mainframes as a file server for some 30,000 users is also supported over the fiber backbone, Kinney said ("IBM, U. of Michigan join in multivendor net study," NW, Aug. 15, 1988).

"We are dedicating some of the fiber for high-speed channel-to-channel links among our three 3090s," he said. "In effect, the three mainframes are acting as a single file store."

In the future, Kinney expects the fiber will also be used for high-speed distribution of mainframe-based files to users all over campus, a project that is now in its fledgling stages. ■

The university supports DECnet over its fiber backbone.

▲▲▲

University of Michigan has established links.

Also at Educom, Northern Telecom and Fibronics International, Inc. will demonstrate an FDDI network that will link multiple Lanstar nets at 100M bit/sec.

Northern Telecom funded two-thirds of the University of Michigan's \$1.5 million fiber backbone expansion and is involved with the school on at least two ongoing projects, Kinney said. The intent of the first project is to develop a Lanstar-to-IP gateway. In the second, Northern Telecom is playing a role in the school's beta test of

Data Packets

continued from page 23

of X.25 products.

The DN 25 X.25 network management system, based on an IBM Personal System/2 Model 70 or Hewlett-Packard Co. Vectra Model QS20, provides a single point from which to manage and control Dynatech's CPX series of products. Besides collecting alarms from attached devices, it allows for downloading of PAD and switch parameters from the personal computer to the PAD or switch and has a graphical interface based on Microsoft Corp.'s Presentation Manager. Available now, the DN 25 X.25 costs \$25,000, including all necessary hardware and software.

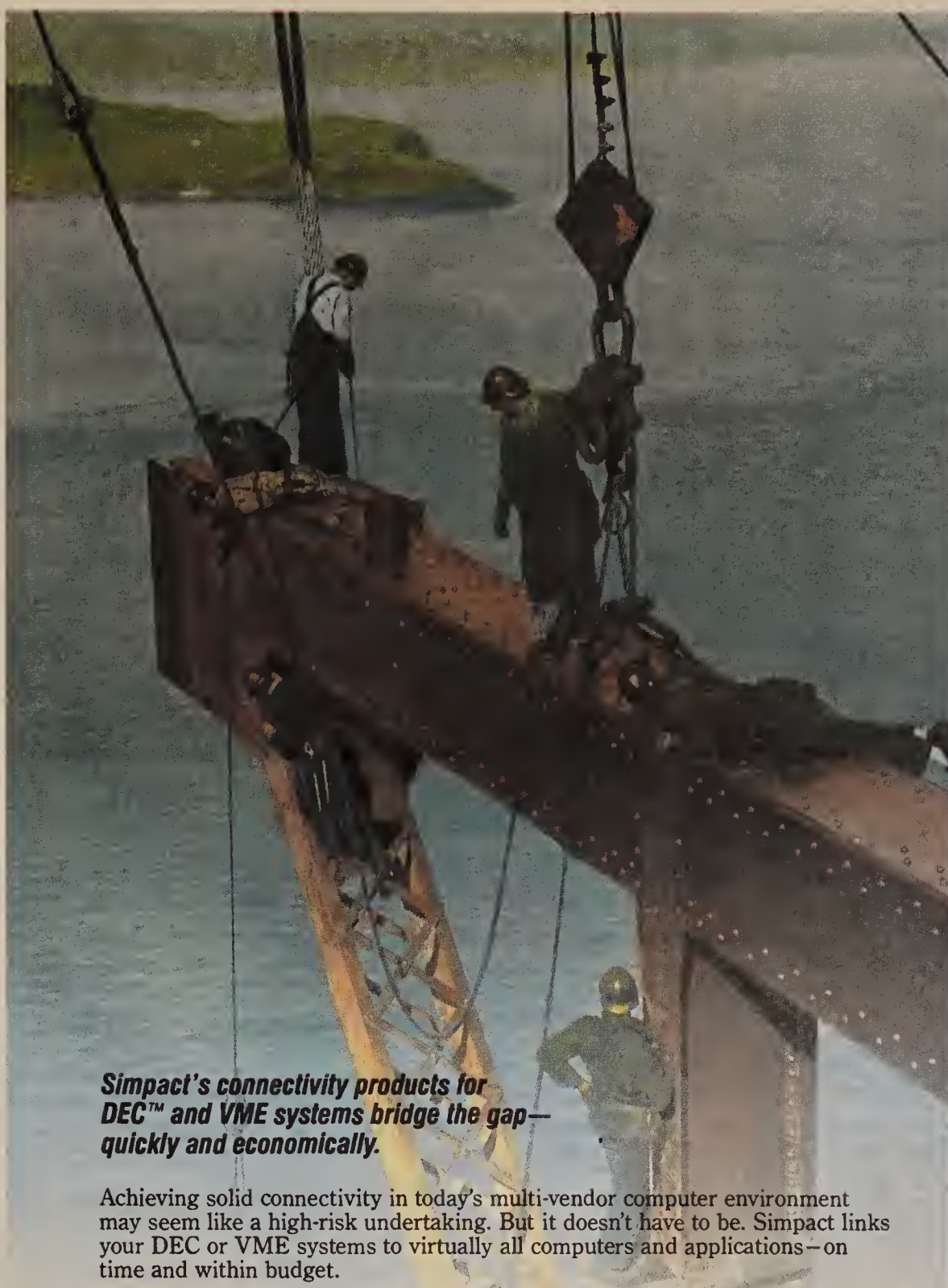
Dynatech also introduced the CPX 10, a packet switch that supports up to 10 trunks running at 64K bit/sec each and up to 1,024 simultaneous virtual circuits. The device handles up to 20 calls per second and has throughput in excess of 500 packet/sec, based on 128-byte packets.

Finally, Dynatech introduced the CPX 16, a PAD that supports up to 16 asynchronous ports at up to 19.2K bit/sec each. It supports a single high-speed V.25, V.35, V.11 or X.25 trunk at up to 64K bit/sec.

Both the CPX 10 and CPX 16 are available now. The CPX 10 costs \$7,950, and the CPX 16 costs \$4,650.

For more information, contact Dynatech at 991 Annapolis Way, Woodbridge, Va. 22191 or call (703) 550-0011.

Air Canada recently purchased a 1% equity stake in **Covia**, becoming a joint owner along with six other partners of the travel services company. Terms of the deal were not disclosed, but USAir, British Airways and Swissair each gave up fractional amounts of ownership in the sale. Other Covia owners are United Air Lines, Inc., KLM Royal Dutch Airlines and Alitalia Airlines. ■



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Report predicts net users will resist ISDN

continued from page 23

"The conventional wisdom for 10 years now has been that private networks as we know them today will disappear as ISDN becomes pervasive because that is what ISDN was invented for," Bosomworth said.

But while ISDN standards development was plodding along, development of private network technology mushroomed.

The advent of private T-1 and T-3 networking, high-speed private X.25 networking and satellite nets that use very small aperture terminals gave users economical alternatives to the public-switched network, especially for data applications.

"Transmission technology has run

quite a bit ahead of the [ISDN] standards-making activities," Bosomworth said. Users with applications requiring bandwidth that is greater than the Basic Rate Interface will find it more economical to remain with leased T-1 lines rather than paying the switched costs for Primary Rate Interface channels, Bosomworth predicted.

In fact, T-1 and T-3 networking, along with packet switching, will account for the major growth in private networking, according to the report. These technologies can support greater bandwidth than current ISDN standards.

Broadband still young

Development of broadband ISDN standards, which are currently in their infancy, may provide high-speed switched connections over fiber-optic cable as well as high-

er speed backbone ISDN facilities, such as T-3.

But that technology is not likely to be usable until 1992 — at the earliest — giv-

alternatives for certain private data services such as point-to-point file transfers between microcomputers. It will also support CCITT Group IV facsimile transmis-

But while ISDN standards development was plodding along, development of private network technology mushroomed.

▲▲▲

ing users more reason to remain with private networks.

The report does acknowledge that ISDN will be a viable option for some users. For example, ISDN will provide less expensive

sion, which requires 56K bit/sec channels.

"ISDN very much facilitates Group IV fax," Bosomworth said.

However, ISDN may not be able to support the high transmission bandwidth of some data networking applications as inexpensively as a private network.

"We're pointing out that while ISDN will recapture some of the private network market, it will not recapture all of it," Bosomworth said. ▀

Congress backs nat'l net, wants overhaul

continued from page 23

NREN "an appropriate short-term solution to a pressing need — supercomputer research. But in the long term, this is not a strategy for national success."

Markey said the U.S. has "no coherent plan for bringing sophisticated voice, data and video services to the marketplace" but is instead "relying on a hodgepodge of private networks to bring these services to a small number of users — primarily large corporations and research centers."

Unlike Japan and France, which invest heavily in their public telecommunications network, the U.S. has traditionally relied on private networks to handle sophisticated information needs, Markey said.

In the long run, Markey said, Congress should adopt policies that ensure access for all users to an up-to-date public communications highway.

To build only NREN and not upgrade the public network "is the equivalent of spending taxpayer dollars to create an eight-lane superhighway with on ramps only available to the privileged few," he said.

Markey suggested that to promote the enhancement of the public network, a number of separate but related issues must be addressed. These issues include the Modified Final Judgment, cable and telephone company cross-ownership, regulatory pricing mechanisms and high definition television.

The subcommittee's ranking minority member Matthew Rinaldo (R-N.J.) said that while he backs the creation of a high-speed national research network, he would like to see every possible alternative to federal funding explored. Tax credits to the private sector may be one alternative, he said.

Rinaldo suggested that the telephone companies' participation in the national network could also dramatically cut the network's start-up costs but questioned whether legislative changes would be necessary to legally involve those companies.

Janice Obuchowski, assistant secretary for communications and information at the National Telecommunications and Information Administration said the agency is scheduled to release a full report on the current status of the domestic telecommunications infrastructure within a year. ▀

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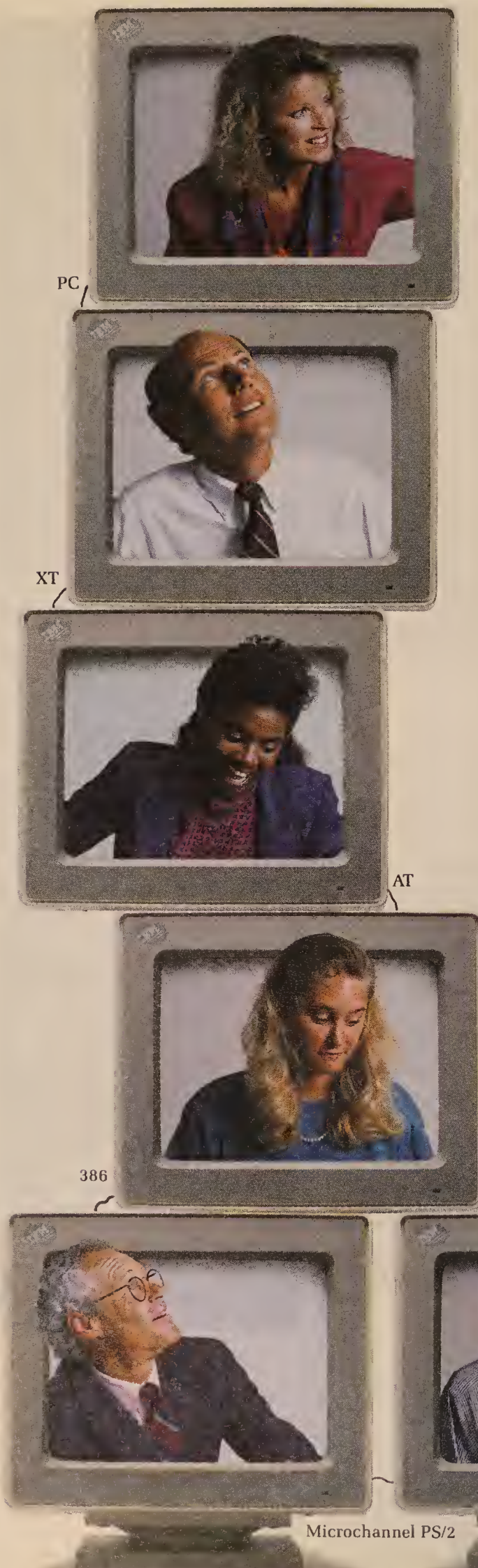
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LOCAL NETWORKING

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Worth Noting

“There are three times as many computer viruses making the rounds this year as there were in 1988. But users are less willing to talk about it than ever since publicity only inspires copycatting and more malicious acts.”

Harold Highland
Virus expert and
editor of *Computers and
Security* magazine
Oxford, England

Netnotes

Advanced Micro Devices, Inc. (AMD) and Digital Equipment Corp. have entered into a technology agreement that calls for AMD to manufacture and sell 100M bit/sec Fiber Distributed Data Interface (FDDI) chips designed by DEC.

AMD will build two very large-scale integration chips especially designed by DEC for use in AMD's forthcoming Supernet-3 FDDI chipset.

The Supernet-3 FDDI chipset, which has no scheduled ship date, will be fully compliant with the emerging ANSI X3T9.5 FDDI standard, according to an AMD spokeswoman.

Supernet-3, which is expected to accelerate industry acceptance of FDDI, will cost only about one-third the price of AMD's current Supernet chipset.

The initial Supernet implementation, which began shipping in the first quarter of 1989, costs \$625 in 100-unit quantities.

The AMD spokeswoman said the company plans to ship an enhanced version of the chipset, called Supernet-2, in 1990. Supernet-2 will have three chips instead of five and will incorporate Station Management Software (SMT) that is fully compliant with the evolving SMT portion of FDDI. □

3Com cuts prices for net interfaces

By Laura DiDio
Senior Editor

SANTA CLARA, Calif. — In a move that reflects increased price competition in the market for local network interface hardware, 3Com Corp. last week became the latest vendor to cut price tags, slashing up to 22% off its family of Ethernet adapters.

At the same time, the company said it has increased the warranty period from one to three years on all Ethernet and token-ring interfaces shipped after Aug. 21.

The price of 3Com's EtherLink II interface has been cut from \$445 to \$345. The adapter connects IBM Personal Computers, ATs, XTs, Personal System/2 Models 25 or 30 and compatibles to IEEE 802.3 10M bit/sec Ethernet.

The price of the company's EtherLink/MC adapter for Micro-Channel-based IBM Personal System/2 Models 50, 60, 70 and 80 has also been reduced 17% from \$595 to \$495.

3Com's adapters are compatible with all of the major network operating systems, including Novell, Inc.'s NetWare, Banyan Sys-

tems, Inc.'s VINES, Digital Equipment Corp.'s DECnet and Sun Microsystems, Inc.'s PC-NFS.

3Com attributed the price reductions to manufacturing economies of scale resulting from continuing plant automation and order increases. In a prepared statement, Andy Verhalen, vice-president and general manager of 3Com's Transmission Systems Division, said this marks the fourth consecutive year the company has cut the list price on its adapters an average of 13.5%.

Buyer's market

Analysts, however, say Ethernet adapters are a commodity item today, and prices have been steadily declining in what is escalating into an all-out price war.

3Com archrival Novell threw down the gauntlet earlier this year when it announced it would sell Ethernet adapters to its resellers for \$125. Although the resellers sell the adapters to end users for considerably more, Novell's move signaled the beginning of the price plunge.

Other competitors, most notably Western Digital Corp., soon followed suit. The average price of an Ethernet adapter card is now about \$413, down from over \$500 during the same period a year ago, said Mary Modahl, an analyst with Forrester Research, Inc. in Cambridge, Mass.

“The trend is certainly downward for Ethernet attachments,”
(continued on page 30)

HP provides single-source service for multivendor nets

By Laura DiDio
Senior Editor

PALO ALTO, Calif. — In a move designed to provide users with a single source for multivendor local network service and support, Hewlett-Packard Co. is now authorized to service and

stall Novell and 3Com local nets.

PC-LAN Support builds on that program by authorizing HP to isolate and resolve problems with any device, including cabling, that is supported by local networks, said Taia Ergueta HP's multivendor support product market manager.

Established in response to user demand, PC-LAN Support gives users access to dozens of HP response centers nationwide. Once a user signs up for the service, HP installs an on-site modem to give HP technical service personnel 24-hour direct access to users' nets so they can analyze, locate and isolate problems.

“Eighty to 90% of the time, a problem can be resolved with just a phone call; our technical support staff simply views the network using our network management software and remote access tools to spot the problem,” Ergueta said.

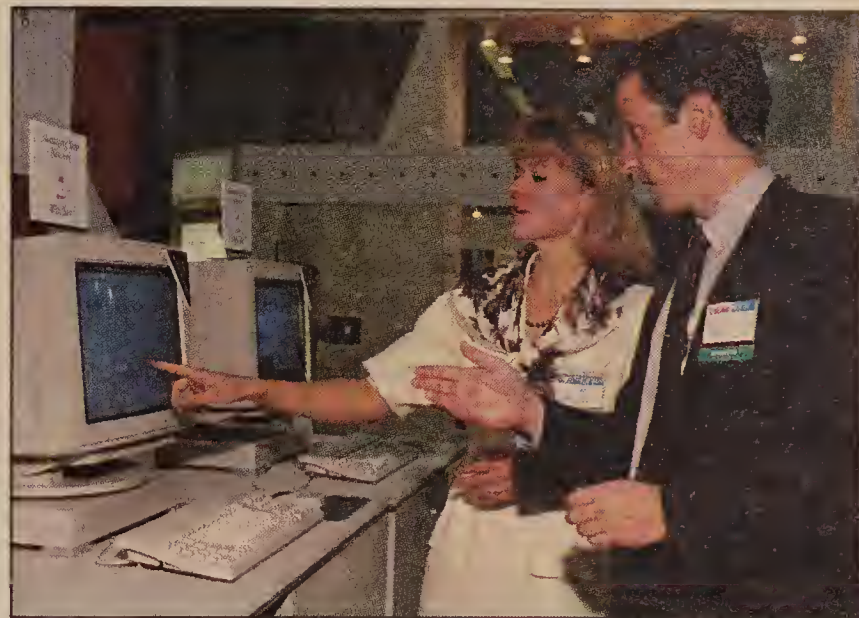
On those occasions where the problem cannot be resolved remotely, an HP technician will be
(continued on page 30)

Hewlett-Packard
installs an on-site
modem to give HP
technical service
personnel 24-hour direct
access to users' nets.

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maintain 3Com Corp. and Novell, Inc. local nets.

The new service, called HP PC-LAN Support Service, is an extension of HP's existing NetAssure program, which enables it to in-



Sun's Brian Biles discusses the SunNet Manager's support of SNMP.

SNMP takes center stage at Interop '89

Attendees treated to smorgasbord of SNMP products for managing TCP/IP-based networks.

By Susan Breidenbach
West Coast Bureau Chief

SAN JOSE, Calif. — The recent Interop '89 exhibition here included coming-out parties for several internetworking standards, but center stage belonged to the Simple Network Management Protocol (SNMP), a standard net management scheme for TCP/IP networks.

In true feast-or-famine fashion, users who last year were clamoring to no avail for tools to manage their Transmission Control Protocol/Internet Protocol networks found themselves faced with a smorgasbord of SNMP products at this year's exhibition.

A number of the products — ranging from management stations with fancy graphical interfaces to SNMP agents for Ethernet boards, network analyzers and routers — are currently available or will be shortly.

“It was a product demonstration, not just a technology demonstration,” said Dan Lynch, president of Advanced Computing Environments, Inc. of Mountain View, Calif., the firm that hosts the Interop conference.

SNMP technology has evolved into products in a remarkably short time. The Internet Activities Board only began development of the SNMP standard in March 1988.

There are three basic components to SNMP: a network management host, such as a workstation or personal computer; the devices to be managed, such as routers or terminal servers; and a Management Information Base (MIB), which defines the parameters of what SNMP can observe or control.

The host manager contains an SNMP client program, while the

devices being managed run an SNMP agent program. The client queries or commands the agents, which respond with network data or actions.

Proteon, Inc. of Westborough, Mass., was showing off both its OverView Network Management System and its p4200 routers acting as SNMP agents. OverView, which runs on an AT-compatible personal computer, was one of the first commercially available SNMP network managers.

“It was a product demonstration, not just a technology demonstration.”

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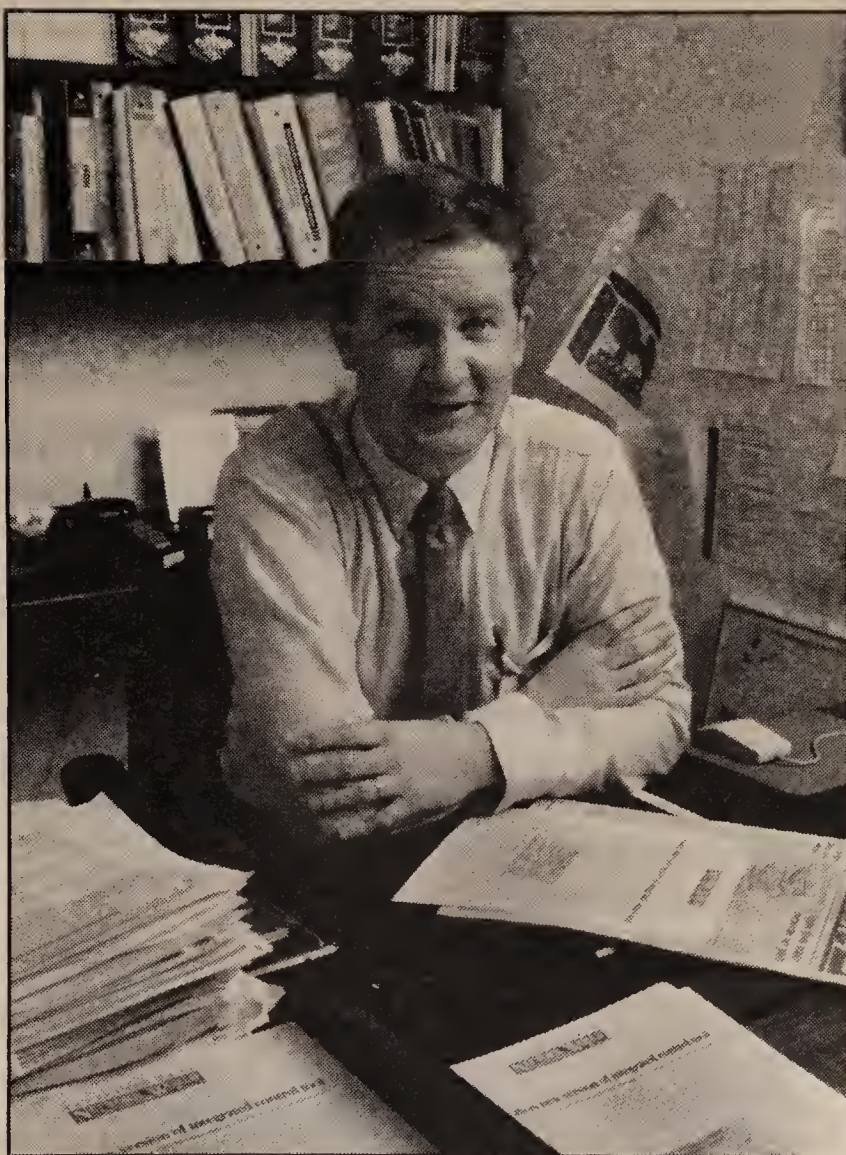
Vitalink Communications Corp. of Fremont, Calif., has added SNMP client capabilities to its WANmanager net management product, an X/Window System application for Digital Equipment Corp. VAX workstations running Ultrix.

The WANmanager software was demonstrated at Interop along with Vitalink's new router, a combination IP router and media access control-layer bridge called TransPath, which can act as an SNMP agent. Both products have been released.

Similarly, Wellfleet Communications, Inc. of Bedford, Mass., participated in the SNMP interoperability demonstration with a variety of routers and bridges that contain SNMP agents. Well-
(continued on page 30)

“Network World editorial reprints
are an important part of our public
relations program.”

Chris Carroll
Media Relations Manager
Codex Corporation



Based in Canton, MA, Codex Corporation is a subsidiary of Motorola with 4,000 employees in 50 countries. It's the largest independent supplier of integrated networking equipment and systems. And, according to Chris Carroll, Media Relations Manager, keeping the marketplace up-to-date on the company's broad range of voice and data communications systems is no easy task. Fortunately, Codex gets lots of help from *Network World* editorial.

"Our customers and prospects readily recognize the Network World logo and have great respect for the publication. They depend on its quality editorial week after week. So when Codex gets covered, we know our products and strategies are getting valuable exposure in the marketplace."

"That's why editorial reprints are an important part of our public relations program. We primarily use Network World editorial reprints as leave-behind pieces for our sales representatives and distributors. The reprints are accurate, credible, and quick to obtain. In fact, these four-color reprints give us a current, slick-looking collateral piece for the field in just a few weeks."

"Take for example, Codex's recent introduction of DualVIEWTM, the industry's first modems that can be managed by a Codex network management system as well as IBM's NetView. Network World presented an excellent analysis, accurately portraying the real significance of this complex product to the marketplace. We knew this coverage could go a long way in augmenting our marketing efforts."

"Within one month, we had, in our hands, quality reprints from Network World. So we were able to quickly build on the positive awareness generated by the product introduction to further communicate the strategic positioning of DualVIEWTM. No other weekly could have delivered this valuable sales tool as quickly."

"At Codex, timely reprints from a respected publication are a credible and quick way of getting our message out to users."

Network World quality editorial. It's accurate, up-to-date, and in-depth. And it's exclusively focused on networking. That's why corporations like Codex capitalize on coverage in *Network World* to enhance their positioning in the marketplace. To put these valuable editorial reprints to work for your company, call Donna Kirkey in *Network World's* Reprints Department at 1-800-343-6474 (in MA, 508-820-2543).

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SNMP takes center stage at Interop '89

continued from page 27

fleet has also released an SNMP-based network management package that runs on a Sun Microsystems, Inc. workstation under X/Windows.

Protocol specialist The Wollongong Group, Inc. of Palo Alto, Calif., which offers an SNMP agent for Sun's SunOS, used Interop to introduce a client agent for Apple Computer, Inc.'s Macintosh IIx. Wollongong also demonstrated SNMP agents for DEC's VAX/VMS systems, NCR Corp.'s NCR Tower computers and Wollongong's own 386 Streams products.

Santa Barbara, Calif.-based Communication Machinery Corp. (CMC) was at Interop with a new release of its TCP/IP For

Unix software. The software contains an SNMP agent and makes CMC one of the first companies to include SNMP as a standard feature of intelligent Ethernet adapters.

Many of these companies — and others with SNMP products at the show — were able to hurry SNMP products to market because of technology they licensed from a small handful of companies that played key roles in the initial development of the SNMP standard. They include companies such as NyserNet, Inc. of Troy, N.Y., SNMP Research, Inc. of Knoxville, Tenn., and Epilogue Technology Corp. of Capitola, Calif.

Epilogue released an MIB compiler at Interop that vendors can use to turn written descriptions of network devices into MIB data without laborious hand coding. NyserNet and SNMP Research released

new versions of their client and agent software, which can be ported to various workstations or devices by vendors, or purchased directly by users.

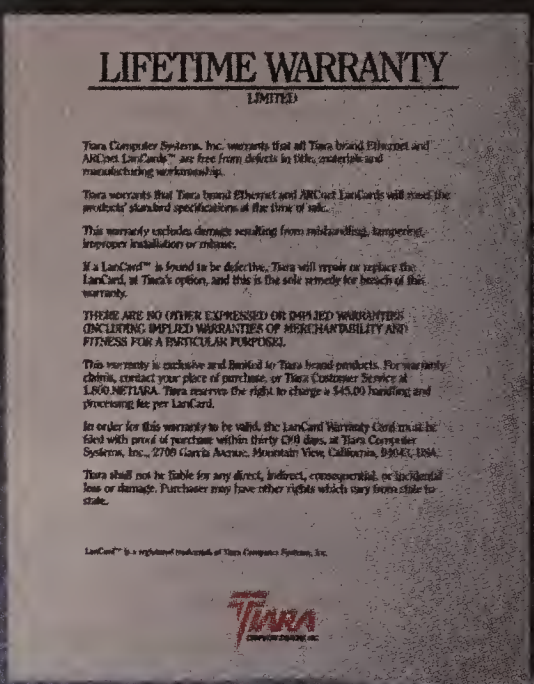
"On the surface, our end-user products may not have all the sizzle of some, but we are coauthors of the SNMP standard and no one has better underlying technology," said Martin Schoffstall, vice-president of research and technology for NyserNet. NyserNet's products also cost "an order of magnitude less" than the more commercially visible products, he said.

One SNMP network management system at Interop with plenty of sizzle was Santa Barbara-based Advanced Computer Communications, Inc.'s (ACC) ACS 4800. Based on a Sun workstation, it has a dazzling graphical user interface with a map builder for creating maps of devices that

need managing. As a map is built, a unique Rolodex-style data base is automatically created, with one "card" for each device added to the map.

"We came in from the user side with the goal of providing the user [with] the easiest access," said Roland Bryan, ACC president and chief executive officer, when asked what distinguished his SNMP management station from others. "We wanted to make a user-friendly MIB a given."

ACC's primary competition is likely to be Sun. Sun, unwilling to merely be the platform option of choice for SNMP management stations, introduced its own SunNet Manager at Interop. Designed as a manager for OSI networks, SunNet includes support of SNMP and has an open architecture third parties can use to add support of other protocols. ☐



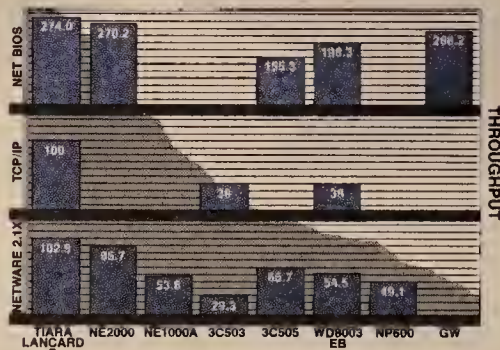
With this, we're easy to remember.



With these, we're easy to forget.

Remembering Tiara is easy. We're the only company that offers a lifetime warranty on network adapters. It's your guarantee of unsurpassed reliability.

But reliability is just one reason to choose Tiara. Our complete line of Ethernet, ARCnet and Token-Ring products also provides exceptional performance. In fact, Tiara's Ethernet LanCards™ recently rated best in third-party performance tests.*



Of course, exceptional hardware deserves exceptional software. So we offer software options like TCP/IP and NetWare. What's more, we now provide network monitoring and diagnostic software designed to keep your entire network running smoothly. Like all Tiara products, it combines high functionality with a very affordable price.

Invest in network products engineered with tomorrow's technology in mind. Ask for Tiara by name. We'll have your network running so well, you may forget we're even there. Call 1-800-NETIARA for the distributor nearest you.



*Compaq Application Note number AN89-0002 Jan. 1989. Performance determined via proprietary NetBIOS test. Epilog Technology TCP/IP performance report July 1989. Performance determined via FTP file copy Xenix host to DOS. Large software developer. LanCard is a registered trademark of Tiara Computer Systems, Inc. All other product or company names are trademarks of their respective companies.
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HP provides single-source service

continued from page 27

dispatched to the users' site within four hours to perform the necessary maintenance.

Ergueta said HP already has several pilot users signed up for the service. One user, Barry Prokop, manager of personnel technology at Fairfax County Public Schools in Fairfax, Va., said the program has provided him with the security of having just one point of contact for all service and support.

The school system encompasses over 200 schools in a 400-sq.-mi. radius and uses Novell and HP equipment.

"Our biggest problem when something broke down before was determining which vendor was responsible for what equipment, and that was a real hassle," Prokop said. "The HP PC-LAN Support Service saves us a lot of time and headaches."

The HP PC-LAN Support Service is available immediately in the U.S. through HP's support sales engineers. The service will be available throughout Europe and Canada in early 1990, Ergueta said. The price of the service will vary according to the individual user's contract, she added.

For more information, contact HP at (800) 752-0900. ☐

3Com cuts prices for net interfaces

continued from page 27

Modahl said. "Western Digital has assumed the leadership role in [Ethernet adapter] price cutting, while 3Com has been a follower."

Further price cuts are inevitable, she said, and this poses more of a problem for 3Com than its competitors, since such a substantial portion of its revenue is derived from interface sales, Modahl said. By 1990, Forrester estimates the average selling price of an Ethernet adapter will be about \$350 and will decline to about \$210 in 1991.

"Since the beginning of the year, adapter prices throughout the industry have been cut about 30%," agreed Doug Gold, manager of communications industry research at International Data Corp., a market research firm in Framingham, Mass.

"The margins on these products are very slim. Novell, [Western Digital] and others have been eroding 3Com's market share," he said.

According to Gold, vendors will be forced to compete on support as well as pricing to retain market share. ☐

See the FAXNET Form on Page 75



MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Dialogue

Do you believe Digital Equipment Corp. has been unfair to users by waiting more than a year to release information about the Enterprise Management Architecture (EMA) network management system?

“They aren’t manipulating the market; it’s just their way of responding to multiple demands from customers for a network management system. DEC’s expertise in network management and telecommunications has to be extremely limited. As a maker of computer systems, EMA represents their first real exposure to the world of telecommunications networks.”

James Sever

Manager of network quality and reliability
Westinghouse Electric Corp.
Pittsburgh

“It took DEC awhile to come out with the EMA, but they’ve got it, and it’s a pretty good system.”

“If it took them a little longer to produce EMA, so what? I’ll admit I could have used EMA earlier, but then again, I could have used a lot of things sooner than they were available.”

Fitch Williams

Manager, technical management information systems
Rocketdyne, a division of Rockwell International Corp.
Canoga Park, Calif.

“DEC has been quiet about EMA because they didn’t have a complete story to tell. Now that their schedule is on track, they’ve begun to brief customers fairly regularly. DEC now knows how its going to roll out EMA and how it will migrate users to the system.”

Jim Herman

Principal
Northeast Consulting Resources, Inc.
Boston

“I’m sure DEC will unveil EMA when they feel they can offer customers something that will work well. They don’t want to shoot themselves in the foot.”

“Although we’re a DEC house, we’ve got plenty of projects to keep us busy in the near future. We’ll deal with EMA when it comes along, and I’m sure it will be of benefit to us.”

Phillip Evans

Director of telecommunications
FMC Corp.
Dallas

Used equipment exchange firm helps members save

Holds roundtables for users to solve problems.

By Wayne Eckerson
Staff Writer

PRIOR LAKE, Minn. — For the past 10 years, NOREX, Inc. has helped users exchange used computer and communications equipment, as well as information about technology and management issues.

Formerly called the North American Computer Exchange,

Inc., NOREX provides its 450 corporate members with a listing of used computer and communications equipment, and regularly sponsors roundtables where members discuss topics of concern to them in an open manner.

“Our aim is to bring users together to solve their own problems,” said John Miller, president of NOREX. “We also help them chase down good prices for their equipment.” NOREX maintains a data base of used data processing and communications equipment members need or want to sell.

About three years ago, NOREX began listing telecommunications equipment, such as private branch exchanges and phone sets. Telecommunications equipment accounts for about 5% of the data base entries and is expected to account for about 20% in the next few years, Miller said.

Each issue of NOREX’s monthly newsletter contains a printout of available and wanted equipment. Last month’s issue, for example, contained 41 pages of used equipment for sale and 28 pages of equipment members would like to purchase.

(continued on page 32)

Users group miniprofile

Founded: 1980

Purpose: To help members acquire and sell used data processing and telecommunications equipment, and exchange information about products, vendors and management issues.

Members: 450 large and small corporations throughout the U.S.; most use primarily IBM and compatible equipment.

NOREX

SOURCE: NOREX, INC., PRIOR LAKE, MINN.
GRAPHIC BY SUSAN J. CHAMPENY

BOOK REVIEW

BY ERIC SCHMALL

Book recounts Columbia’s PBX job, lacks good editing

Secrets of Installing a Telephone System, Neil Sachnoff (New York: Telecom Library, Inc., 1989), \$22.95.

In the space of 20 months, Neil Sachnoff managed the installation of more lines, phone sets and copper pairs than most network managers accomplish in 20 years.

As project manager for the installation of an IBM 9751 private branch exchange for Columbia University from 1986 to 1988, Sachnoff was responsible for rewiring 75 buildings and installing 10,000 station lines, 13,000 voice/data jacks and 27 T-1 lines. *Secrets of Installing a Telephone System* is his account of this herculean task. In the book, Sachnoff attempts to share some of the lessons he learned from managing this megaproject. Unfortunately, the overall result is disappointing. Although his advice is sound and largely free of technical error, Sachnoff’s message is corrupted by an awkward writing style and his publisher’s appalling lack of editing support.

Grammatical errors and misspellings abound. Consider this sample from a section titled “Miscellaneous advice”:

“An item that is even more difficult to control than the dust caused by drilling is protecting the project from being blamed for damage that was caused by someone else or prior to you beginning your work. Cracks and holes in walls, nicks on furniture, ceiling tiles missing, torn carpets, dirty walls and

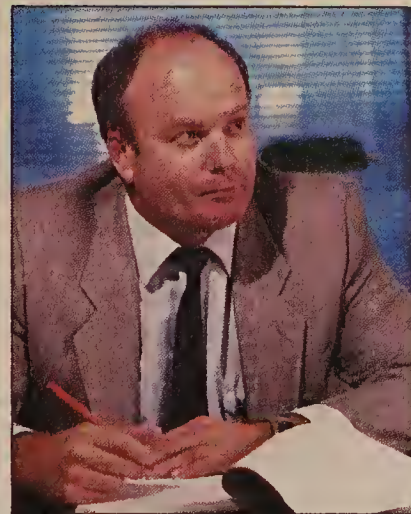
(continued on page 32)

Schmall is network systems manager for an insurance holding company.

MANAGEMENT PROFILE



BY BARTON CROCKETT



Jeff Smith



Mark Waldschmidt

Engineering firm’s net a money-maker

SAN DIEGO — Users who think that networks only cost their companies money should consider Science Applications International Corp. (SAIC), an \$865 million engineering firm based here.

Under the direction of Jeff Smith, SAIC vice-president of business development, the company over the last three years has transformed its internal net operations group into a communications service provider that this year pulled in revenues exceeding \$10 million. Over the next two years, Smith expects revenues generated by the group to swell to over \$30 million annually and to possibly approach \$100 million by the end of the 1990s.

SAIC generates revenue by selling an array of services to users, including design and installation of videoconferencing networks, data network design and network consulting services.

Nearly all the company’s internal network managers are involved in the sales effort. “We leverage what we have internally in order to get our business moving externally,” Smith said.

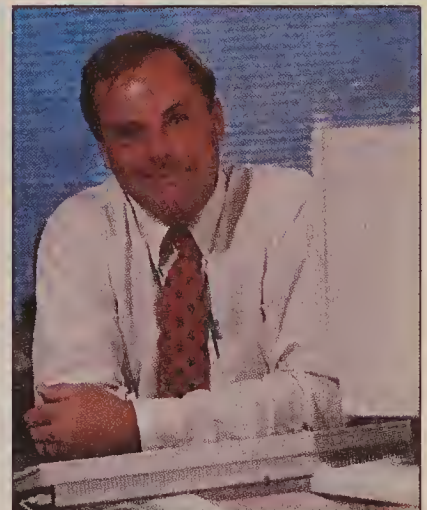
Some of the jobs SAIC has landed are impressive. SAIC built and maintains a four-room, 768K bit/sec videoconferencing network for General Dynamics Corp. The firm has also designed videoconferencing and data networks for Mitre Corp. and the Defense Advanced Research Projects Agency, a military think tank.

Getting to the point where SAIC could become a network vendor required a major revamp of the company’s internal network operations.

Until 1986, SAIC’s network operations were managed by a small staff of four to six professionals who advised the company’s divisions on network pur-

chases. Responsibility for implementing networks was delegated to the roughly 45 to 50 technicians employed by the divisions.

In November 1986, SAIC created a new division known as Telecommunications Systems Operations (TSO). TSO was basically the same group of managers who oversaw purchasing for the entire company, except they were now also responsible for bidding for new network business



Richard Strobridge

as well as running the company’s internal networks.

“We decided to use the people we already had [in the communications department] to bid for new business,” Smith said. “If we won, then we could hire new people to handle the job.”

By taking this low-budget route, Smith said SAIC was able to attack what it perceived as a major new market inexpensively and with minimal risk.

The subsequent success of TSO has allowed SAIC to expand the organization’s payroll to include about 60 people.

As part of this expansion, SAIC has radically changed the duties of its network personnel. A good example of this is Richard Stro-

(continued on page 32)

Engineering firm's net a money-maker

continued from page 31

bridge, SAIC assistant vice-president of telecommunications business development. Strobridge got his start with SAIC eight years ago when he designed the company's internal videoconferencing network, which now links offices in McLean, Va., and Huntsville, Ala., with its headquarters here over 112K bit/sec satellite links.

Now that the network is implemented, Strobridge said he devotes most of his time to selling videoconferencing services. There are also a handful of people reporting to him who maintain the company's internal videoconferencing network.

Other network professionals, such as Mark Waldschmidt, who manages SAIC's

internal data network, said they split their time between working on outside sales and support and handling internal communications needs.

Now that SAIC has gotten its feet wet as a network vendor, Smith says expanding the business will be relatively easy. "It's much harder to grow from zero to \$10 million than from \$10 million to \$30 million," he said. SAIC plans to "start gunning for home runs" by putting out bids for \$10 million to \$20 million network jobs.

Smith said that other users could turn their network departments into revenue centers. "It's largely a matter of examining where you can deliver the value-added and how you can mobilize your organization to get there," he said. "If you've got the skills and the wherewithal, you can do it." ■



SAIC satellite dish

Book recounts PBX job, lacks editing

continued from page 31

everything else that could have been caused by your work. You will get blamed for it." (p. 63)

In this passage, Sachnoff's very valid point is obstructed by the way in which it is expressed.

Hidden beneath Sachnoff's murky prose are nuggets of worthy advice. His discussion of the problems he encountered with asbestos while installing new cable in older buildings is particularly valuable.

Sachnoff's experience in this project taught him lessons that should be shared with other users. Unfortunately, few people will have the stamina to wade through this text in order to profit from it. ■

Times change. Are your LAN connections outgrowing your budget?

You've started tying company LANs into an integrated network only to face the overwhelming demands of other departments that want to connect. While you could inflate your budget buying more hardware each time you add another LAN, with the ACS 4400 there's no need. With up to eight serial ports, a single ACS 4400 grows with your network.

Eliminate extra hardware without compromising reliability.

Cutting down on hardware doesn't mean reducing your network to a single point of failure. ACS 4400 modules function independently, so you can add

or replace them individually without disabling the entire network.

Invest in the future by buying only what you need today.

While the ACS 4400 supports up to eight ports, you don't have to purchase them all at once. You can start with two or four and add more when new requirements arise. So while you spend only as much as your needs require, you also protect your investment by keeping expansion options open.

Tailor the ACS 4400 to fit your needs. As for functionality, the ACS 4400 supports any combin-

ation of ACC's Series 4000 software packages. Each ACS 4400 comes bundled with your choice of software. A single ACS 4400 supports bridging, routing, or combination bridge/routing all at the same time!

For additional information on the ACS 4400 and the entire ACC Series 4000 line of adaptable inter-networking products, call ACC today at 1-800-444-7854.

Advanced Computer Communications
720 Santa Barbara Street
Santa Barbara, CA 93101
1-800-444-7854

ACC
The Interconnectivity Source

ACS 4400.
Cost-effective multiport hardware platform.

The product names mentioned are trademarks or registered trademarks of their respective owners.

Equipment exchange firm helps members

continued from page 31

NOREX has 16 account representatives who try to bring together member companies that are looking to buy and sell a particular type of product. In most cases, account representatives act as a go-between to gather information for busy executives, Miller said. NOREX account reps also facilitate negotiations between members by suggesting a fair market price that will benefit both parties.

If members can't find equipment they need in NOREX's listing, NOREX will research the inventories of other used equipment dealers. Because it does a high volume of business with third-party dealers, NOREX can often get discount prices unavailable to members.

"By far, the biggest value of NOREX is that it allows you to dispose of hardware through one source at good prices," said William Johnson, corporate telecommunications director at F.W. Woolworth Co. in New York.

Johnson also calls NOREX to get references about equipment prior to initiating pilot tests or to find out if other members have already developed software programs he needs to implement. "NOREX has steered me to other members who have provided information that has helped our pilot tests go much smoother and saved us from having to reinvent what others already have done," Johnson said.

Unlike used equipment dealers or brokers, NOREX doesn't charge members a commission fee for arranging a transaction. NOREX members pay an annual membership fee based on the value of their installed computer equipment.

Members also find NOREX's roundtables a unique and invaluable resource for exchanging ideas about technology and management issues.

Each year, NOREX holds two three-day national conferences and three daylong regional conferences. Roundtables have addressed issues such as negotiating with vendors, writing maintenance agreements and installing new equipment.

Before each conference, members submit topics that they would like to have discussed at the roundtable. Guided by a discussion facilitator supplied by NOREX, members then address each topic in an open forum. Discussion continues until the member who submitted the topic feels the issue has been fully addressed.

"Our members are the experts, not NOREX," Miller said. "We try to do everything possible to bring them together and then stay out of their way." ■

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- MicroShare operating system software that lets a NetWare PC support 19 dumb terminals.
- New Mylex line of Ethernet interface cards.
- A wireless local net from Telesystems SLW.

First Look

Integrated Telecom unveils T-1 processor

Integrated Telecom recently announced the **Accustream 2000**, an entry-level T-1 nodal processor capable of supporting up to 16 1.544M bit/sec T-1 trunks or 2.048M bit/sec trunks — the European equivalent of T-1 (E-1).

The Accustream 2000 networking capabilities include end-to-end channel mapping and automatic rerouting when used with Integrated Telecom's Integrated Digital Management System.

The multiplexer features a single chassis package with 10 card slots and accommodates integral power supplies. The system is a small version of the company's Accudacs Series II product and can be equipped with full redundancy to ensure uninterrupted operations.

When used to interface with fractional T-1 service or convert T-1 links to E-1, the device enables each trunk to be partitioned into virtual aggregate channels that can be routed to many locations.

The Accustream 2000 ranges in price from \$8,000 for a device that supports 16 T-1 or E-1 trunks, to \$30,000 for a fully configured redundant system.

Integrated Telecom, 630 International Pkwy., No. 100, Richardson, Texas 75081; (214) 234-3340.

Simpact offers E-mail package for NetWare

Simpact Associates, Inc. of San Diego has a high-
(continued on page 34)

InteCom announces low-end PBX

By Anita Taff
Washington Bureau Chief

ALLEN, Texas — InteCom, Inc. recently announced a new low-end private branch exchange that supports between 100 and 1,000 lines.

The switch, called Telari, uses the same application software as InteCom's larger IBX switches, giving smaller users access to features previously available only to large corporations, according to Ronald Kopecki, vice-president of business development at InteCom.

In its maximum configuration, the switch has two cabinets, each supporting 500 lines. Line cards are available with eight, 12 or 24 ports.

Telari has a nonblocking architecture and supports simultaneous voice and data transmission. It supports speeds up to 19.2K bit/sec for asynchronous data and 64K bit/sec for synchronous data.

The switch also provides three primary types of protocol conversion: asynchronous to 3270; asynchronous to X.25; and asynchronous to 5250.

Other features of the Telari include modemless data switching, least-call routing and a uniform network numbering plan. It sup-

ports InteCom's Open Application Interface to message center capabilities, automatic call distributors and network management systems on an external processor.

Prices for Telari will depend on specific configurations, but the company's goal is a noninstalled price of between \$350 and \$500 per line, according to company officials. A switch supporting 500 lines will cost about \$350 per line.

Air Products and Chemicals,

Telari is nonblocking and supports simultaneous voice and data transmission.



Inc., a national manufacturer of chemicals and industrial gases in Allentown, Pa., beta-tested the product in an order-entry application at a site 30 miles from its headquarters. The switch replaced an existing Northern Telecom, Inc. SL-1.

The switch supports 160 voice lines and approximately 25 dumb terminals, which are linked through the switch to the company's mainframe in Allentown.

Joe Prestileo, telecommunications manager for Air Products, said the SL-1 was not designed to
(continued on page 34)

Ashton-Tate offers training ware for SQL Server users

NEW YORK — Ashton-Tate Corp. last week unveiled a personal computer-based training system designed to help end users learn the fundamentals of using the Ashton-Tate/Microsoft Corp. SQL Server.

The product, SQL Tutor for SQL Server, teaches users how to work with Transact-SQL commands to access data stored by SQL Server. SQL Server is a client/server product that runs under Microsoft Corp.'s LAN Manager and lets personal computer users on a local net share data. So-called front-end software will enable users to access server-based data for use with personal computer applications.

According to Eric Kim, vice-president of Ashton-Tate's Database Division, many front ends will provide transparent access to SQL Server through menus. But users will also be able to query the product directly through Transact-SQL commands. The

SQL Tutor product is designed to show users how this is done. Transact-SQL is a subset of SQL.

SQL Tutor has more than 20 training modules covering a variety of subjects. Once a subject is selected, the product presents written information and key definitions, and then walks the user through a series of exercises showing how commands are used to define, manipulate and control SQL Server data.

The system can track the training programs of as many as 50 users. When users log on, the system automatically starts them at the point at which they completed the last lesson.

The product runs under MS-DOS 2.1 or higher and requires 384K bytes of memory and a hard disk drive. It is priced at \$199 and is scheduled to ship in November.

Ashton-Tate can be reached by writing to 20101 Hamilton Ave., Torrance, Calif. 90502, or by calling (213) 329-8000. □

Fibermux introduces FDDI bridges, routers

Company rolls out product line based on 100M bit/sec standard as way of broadening its strategy.

CHATSWORTH, Calif. — Fibermux Corp. last week announced a series of bridges and routers that support the emerging Fiber Data Distributed Interface (FDDI) standard.

The products — a token-ring source-routing bridge, Ethernet media access control (MAC)-layer bridge and a router for Transmission Control Protocol/Internet Protocol-based Ethernets — represent a broadening of Fibermux's past strategy of providing proprietary multiplexer links for fiber backbones.

Fibermux has embraced a three-part strategy based on transport options, workstation hubs and standards-based networking to link local nets to fiber backbones or to unshielded twist-

ed-pair telephone-type wiring backbones.

Too big to ignore

"The market for unshielded twisted-pair backbones is getting too big to ignore," Kim said. He added that the firm is planning announcements later this month to bolster its support for this technology. The introduction last week of the FDDI products establishes the firm's thrust into standards-based networking, he said.

The FDDI rollout consisted of the FX5500 series of FDDI attachments. The line connects token-ring and Ethernet local nets to a dual counter-rotating ring backbone running at 100M bit/sec.

Each device in the FX5500 line
(continued on page 34)

Wellfleet rolls out brouter designed for small net sites

BEDFORD, Mass. — Wellfleet Communications, Inc. recently announced a low-end multiprotocol router/bridge, the Wellfleet Feeder Node, for small network sites projecting limited growth.

The company also rolled out a new release of software that increases the performance of its mid-range Link Node and high-end Concentrator Node routing bridges, and announced that its products will work with Sun Microsystems, Inc.'s SunNet Manager.

The Feeder Node, which supports a maximum of two Ethernet local network connections and two T-1 1.544M bit/sec wide-area links, provides full multiprotocol router and bridge services, according to the company. In its bridge capacity, the device can forward 11,700 steady-state frame/sec; in its internetwork routing capacity, it can forward 7,200 packet/sec.

A Feeder Node with a single Ethernet and a single T-1 interface costs \$8,995. A node with two Ethernet and two synchronous wide-area interfaces costs \$9,995. The product is available now.

The software that powers the new Feeder Node also boosts the performance of Wellfleet's existing Link Node and Concentrator Node. The software enables the mid-range Link Node, which can house up to four local net-to-

wide-area network interface processors, to support bridge forwarding rates of more than 46,000 frame/sec and packet routing performance of 28,000 packet/sec.

The high-end Concentrator Node, which can support as many as 13 processors, forwards over 150,000 frame/sec or 90,000 packet/sec. The software is available now free of charge for customers supported by Wellfleet's Software Subscription Service.

In a related announcement, Wellfleet said its router/bridges can be managed under Sun's SunNet network management system using the industry-standard Simple Network Management Protocol (SNMP).

Wellfleet's products are integrated with SunNet using resident SNMP "agents" that collect status and performance information and report to SunNet using the SNMP protocol, the company said.

The company will also offer the SNMP-Network Management Software (SNMP-NMS), a program for Unix-based Sun workstations that runs under X/Windows.

SNMP-NMS can monitor any SNMP-compatible device and is interoperable with SunNet.

Wellfleet can be reached at 12 DeAngelo Drive, Bedford, Mass. 01730, or call (617) 275-2400. □

Fibermux introduces FDDI bridges, routers

continued from page 33

is based on an FDDI native framing data format in which data is routed using only FDDI protocols. Other products simply shroud other network protocols in FDDI headers and trailers.

But that approach puts severe limitations on some users, Kim said, because vendors supporting it require the origin and destination subnetworks to be the same (token ring-to-token ring, for instance) to strip the capsule and submit the data to the receiving net.

The FX5500 series devices also come with a built-in ring buffer memory that uses multiple queues for 300M bit/sec block transfers among buffer, FDDI ring and local network interfaces.

In the FX5500 line, the company announced the FX5510T, a source-routing token-ring bridge that provides a link from one token-ring local network to an FDDI backbone. It provides 100M bit/sec bandwidth for 4M bit/sec token-ring nets and routes data by examining the source-routing address in each token-ring packet.

It is available now and costs \$22,000.

The FX5520Z is the company's new Ethernet MAC-layer learning bridge that links up to two Ethernet subnets to an FDDI backbone. The device is a learning bridge, which when attached to a network, develops an understanding of local and out-bound traffic. Consequently, it does not pass local traffic to the remote nets.

The FX5520Z costs \$22,000 and is available now.

Fibermux also rolled out the FX5530Z, a network-layer router for TCP/IP-based networks that uses IP addressing to route packets across the network to their destinations. The device supports up to two locally attached Ethernet segments to an FDDI backbone. It is available now and costs \$22,000.

Later this month, the company plans to unveil a key part of its expanded strategy, the Crossbow line of network hubs for Ethernet local nets supporting the 10Base-T standard for running Ethernet over telephone-type wiring.

The Ethernet hub will support attachment of up to 100 workstations linked via

ThinWire Ethernet cabling, unshielded twisted-pair wiring, traditional Ethernet cabling and fiber cabling. It will also offer built-in redundancy of the hubs' primary active components, a feature Kim said other suppliers do not offer.

The hub will also sport network management facilities based on the Simple Network Management Protocol for TCP/IP-based networks. Kim said the Crossbow line will cost about 50% less per port than competing vendors' products, but he offered no firm pricing.

The company already offers its Magnum Enterprise Multiplexer (FX4400) as a transport mechanism to establish connections between clusters of local nets or terminals and hosts. The FX4400 supports a broad range of protocols, including IBM 3270, Ethernet and token ring. **Z**

First Look

continued from page 33

end electronic mail package in beta test that it says will offer users of Novell, Inc. NetWare local networks a degree of protection not found in traditional E-mail systems.

Aimed at government agencies, government contractors and other organizations dealing with sensitive data, **Securit-E-Mail** has security options that let senders encrypt messages or control access to and the disposition of particular messages.

A sender can assign labels that restrict delivery of an E-mail message to individuals falling into a certain category, such as security clearance level or departmental level. Disposition controls can be used to determine whether recipients have read-

only access or whether they can forward, print or store the message.

A privacy feature lets a sender encrypt a message so only the designated recipient can read it. This feature, based on RSA Data Security, Inc.'s Public Key Cryptosystem, prevents even system administrators with sophisticated diagnostic or management tools from discerning the contents of a message, Simpact said.

A protected gateway connects Securit-E-Mail to most E-mail systems so users can continue to employ the latter for messages that do not require a high level of security. Any message generated on Securit-E-Mail and protected by control features cannot be sent through the gateway to users having access only to traditional E-mail systems.

Securit-E-Mail will be available in Janu-



InteCom announces low-end PBX

continued from page 33

switch data and did not adequately support the company's application.

The company said it thought the Telari would do the job because it was already using an InteCom S/80 for voice and data at its headquarters.

Robert Alexander, communications projects manager for corporate communications systems at Air Products, said the company has used the Telari successfully to switch asynchronous data at 19.2K bit/sec.

Although Prestileo sings the praises of InteCom's technology, he acknowledged that it had been a hard sell to company executives because of the financial troubles of InteCom's parent company, Wang Laboratories, Inc.

Air Products decided to commit to the new InteCom switch because Prestileo said he regards InteCom's products as superior to any other on the market.

With products and service that good, "[Intecom] is going to be around for a while, I think," Prestileo said. **Z**

See the FAXNET Form on Page 75

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ary 1990 for \$7,500 per server.

Simpact Associates, Inc., 9210 Sky Park Court, San Diego, Calif. 92123; (619) 565-1865.

MicroShare unveils operating system software

MicroShare Corp. of Salt Lake City last month released operating system software that turns a personal computer on a Novell, Inc. NetWare local network into a multiuser system supporting up to 19 dumb terminals.

The new **Advanced Network Functions** software works with MicroShare's MBOS operating system, enabling users to expand local networks via clusters of inexpensive terminals. MBOS can run any of

the many commercial applications written in the Business Basic programming language, providing a low-cost solution for users looking to replace aging minicomputer-based accounting systems.

The MicroShare system cannot run DOS applications for terminal users, but it enables them to read ASCII files created in DOS applications and stored on the NetWare server. More importantly, general ledgers and other files created in Business Basic by users at dumb terminals can be sent from the MicroShare host to personal computers on the NetWare network.

These files can be imported directly into Lotus Development Corp.'s Lotus 1-2-3 spreadsheet, for example, for sophisticated analysis.

The MicroShare system software, which runs in a personal computer based on an

Intel 80286 or 80386 microprocessor, is priced at \$895. The computer is equipped with one or more multiport asynchronous expansion boards. An eight-port board supporting eight terminals is available from MicroShare for \$1,195.

MicroShare Corp., 4885 S. 900 East, Suite 107, Salt Lake City, Utah 84117; (801) 262-6755.

Mylex introduces new line of Ethernet interface cards

Mylex Corp. recently announced a line of 32-bit Ethernet interface cards that can be used with its existing Intel Corp. 80386-based motherboard and 32-bit caching disk controller to create high-speed file servers. Mylex developed the products to

solve bottleneck problems caused by the advent of high-speed 80386 and 80486 CPUs, according to Akram Chowdry, Mylex's president.

Faster CPUs send more traffic over the network. But heavily trafficked Ethernets can be slowed to a fraction of their theoretical top speed of 10M bit/sec when standard eight- or 16-bit interface cards and disk controller cards are used, Chowdry said. Increasing the card's capacity to 32 bits lets more traffic flow at any given time.

The adapter card comes in three versions. The **LNA390** works with Intel Corp.'s AT/32 80386 bus, and the **LNE390** is designed for the Extended Industry Standard Architecture (EISA) 486 bus. A 16-bit version, the **LNI390**, is for use in workstations with the standard AT bus. All three versions provide buffering.

Mylex's adapter cards, disk controller and motherboard are compatible with Novell, Inc.'s NetWare.

The 16-bit LNI390, priced at under \$150, and the LNA390, priced at under \$250, are available now. No price has been set for the LNE390, which will ship sometime this month. A Transmission Control Protocol/Internet Protocol version of the adapter card is expected to ship by the end of the year.

Mylex Corp., 47650 Westinghouse Drive, Fremont, Calif. 94539; (415) 657-7667.

Telesystems releases wireless local net for personal computers

Telesystems SLW, Inc. has released a new wireless local network for IBM-compatible personal computers running Novell, Inc.'s NetWare local net operating system.

The **ARLAN 450** microcomputer interface incorporates a data packet radio and network access unit and can be used to link personal computers to existing cabled networks such as token ring, Ethernet or Arcnet.

The card, part of Telesystems' ARLAN 400 series of products, features advanced spread-spectrum radio technology — a technology that uses a low-power signal diffused over a broad band to avoid detection by unauthorized users and to overcome interfering signals.

The ARLAN 450 local network card is available now through Telesystems and Novell dealers, and it has a list price of \$1,500.

Telesystems SLW, Inc., 85 Scarsdale Road, Suite 201, Don Mills, Ontario, M3B2R2; (416) 441-9966.

Telenet announces links to its Telemail 400 E-mail system

Telenet Communications Corp. recently announced it will support links to its Telemail 400 public electronic messaging system without requiring the user to purchase X.400 gateway software.

To support the service, Telenet installed Soft-Switch, Inc.'s Central E-Mail gateway software on its Telemail 400 host. The software translates proprietary electronic mail formats into the X.400 standard required by Telemail 400. Among the E-mail systems supported are those from Digital Equipment Corp., Hewlett-Packard Co., IBM and others. The service is expected to be available in 1990.

Telenet Communications Corp., 12490 Sunrise Valley Drive, Reston, Va. 22096; (800) 835-3638.

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OPINIONS

AUTOMATIC NUMBER IDENTIFICATION

BY STEPHANIE LEE

Users beware the potential dangers of ANI

The problem with automatic number identification (ANI) is not that it identifies the caller to the recipient; the problem is that it identifies the caller's *location* to the recipient. Besides being a violation of the caller's rights, this is a potentially dangerous fact because this information can easily be abused.

I agree that people have a right to know who is calling them. That is why we, as a society, have developed standard telephone etiquette to include self-identification immediately following the greeting. ("Hello, Professor Daniels; this is Stephanie.")

If you want to know who the caller is before answering the phone, you can buy an inexpensive answering machine with

I do not always want the person I am calling to know where I am at a given time of the day.

▲▲▲

The call-screening feature on my \$50 answering machine has rid me of prank calls, since prank callers apparently want to shock a person, not a machine. Furthermore, since my number is one digit different from that of a very busy ticket agency, my message informs callers of their dialing errors and rids me of those many unwelcome calls.

And yet, as much as it is my right to know who is calling, it is not my right to know the location of that person. What percentage of the calls that you make are from your home? Unless you are one of the lucky few with a home office, probably a very small percentage of your calls are made from home.

I often make calls from my office, a client's office or a friend's home. Usually these are business calls; occasionally they are personal. I do not always want the person I am calling to know where I am at a given time of the day or night.

A business rival or a serviceperson does not have the right to know who my clients and my friends are. That violates the rights to privacy of my clients, my friends and myself. It is also a security hazard; if someone knows that I am calling from an office across town, then my home becomes vulnerable to a burglary.

The suggestion that ANI be designed to identify calls from pay phones — with the implication being that these would immediately be rejected as prank calls — would greatly hinder those of us who rely on pay phones during business trips. It is also a disservice to low-income people who cannot afford a home phone and must make all calls from pay phones.

Another potential hazard exists with call-screening via ANI. Suppose a call comes in from a number that you determine to be a pay phone in a crime-ridden area of town, and you decide to ignore the call. But what if the call is from a loved one whose car has broken down in that area?

The use of ANI not only violates rights, it is based on the dangerous assumption that the importance of the call can be determined by the number from which it is dialed. Given these dangers to the consumer, it seems clear that ANI proponents are really interested only in helping service-oriented businesses. I, for one, would rather not interact with a company that chooses to use ANI. ■

Lee is a telecommunications consultant based in Oakland, Calif.

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EDITORIAL

DEC should let users in on EMA secrets now

News is that Digital Equipment Corp. will make a major Enterprise Management Architecture (EMA)-related announcement on Nov. 13.

It's about time.

DEC has been too cryptic for too long about EMA, its blueprint for managing networks of multivendor equipment. Users need to know when DEC's EMA products and those of its EMA partners will be delivered and when key EMA specifications — the information vendors and users need to develop EMA applications — will be released.

Users are making integrated net management system buying decisions today, and they deserve an in-depth explanation from DEC — one of the most important players in the computer/communications industry — about its network management strategy.

Without that, DEC runs the risk that users will look elsewhere for vital network management products. Users run the risk of being disappointed or suffering delays if they wait for DEC to make its intentions clear.

It's been well over a year since DEC laid out the first rough plans for EMA. It's high time the vendor made known what tools it will deliver under EMA and when.

As explained by DEC, EMA would give users the best of both distributed and centralized network management by providing them with tools to monitor and control, from a central site, net-

work management products controlling individual network components.

DEC said it would unveil the first EMA products by the middle of 1989 and would publish product interface specifications before then.

In April, DEC acknowledged that the general release of the EMA specifications had been postponed but said EMA development was on track. The com-

DEC needed to reassure its customers that an open, integrated network control system was a major development priority.

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pany vowed to make announcements under the EMA banner by year end but declined to discuss what would be announced — actual products or a fleshed-out statement of direction.

EMA partners interviewed by *Network World* in April said DEC had shown them a schedule of upcoming EMA announcements, which they could not discuss.

DEC wasn't saying anything about that schedule. In fact, from that point on, DEC has said

very little about EMA.

Two weeks ago, those EMA partners told *Network World* that DEC has scheduled a major EMA-related announcement for mid-November. They said DEC will unveil the first EMA product, a network management console that will ultimately enable an operator to monitor and control any EMA-compatible tool from a single console.

They said the company will also announce new members of the EMA team and details about the rollout of other EMA products.

DEC isn't talking about that upcoming announcement either.

It's not difficult to understand why DEC thought it had to make its integrated net management system intentions known early on. Major companies such as AT&T and IBM have announced products and are now delivering, or at least demonstrating, them.

DEC needed to reassure its customers that an open, integrated network control system was a major development priority.

But since September 1988, that's about all DEC has done. And it's not enough.

Users need to know what products DEC is working on and when they'll be ready for shipment so they can compare the planned offerings against those of other companies.

It's time for DEC to lay its cards on the table. ■

OPINIONS

THE BUSH FCC

BY ALAN PEARCE

Give me that old-time regulation

Old-style regulation is back in vogue at the Federal Communications Commission. The three newly appointed FCC commissioners made this abundantly clear during their confirmation hearings.

During the hearings, Sen. Ernest "Fritz" Hollings (D-S.C.), chairman of the Senate Commerce Committee, told the three new Republican commissioners, Alfred Sikes, Andrew Barrett and Sherrie Marshall, "You folks take an oath to regulate, not deregulate." Hollings is a self-styled "born-again" regulator; he firmly believes that deregulation has not only gone too far but, in fact, has failed.

Clearly he and other politicians on Capitol Hill plan to reassert their traditional role of controlling not only the purse strings, but also the policies of the FCC. In response to questions from Hollings, FCC Chairman Sikes said, "I think I am [at the FCC] to carry out the policy of the Congress."

Commissioner Marshall said, "I agree. You make the policy, and we implement it."

But Commissioner Barrett said, "I would think that as long as the Congress' policy is in the public interest, I certainly would agree with Mr. Sikes."

Hollings then scolded Barrett, saying, "You cannot come along with that answer. We cannot have an individual measure of the public policy."

Barrett quickly recanted, "I would think that any piece of legislation that comes out of either House would be in the public interest, and if that is the answer you are seeking, my answer is yes, I would support that."

Sen. Al Gore (D-Tenn.) vigorously questioned Marshall, who served at the FCC under former Chairman Dennis Patrick, about her role there. She explained that she was hired by Patrick as the "resident pragmatist" to see if she could improve the FCC's relationship with Congress. She added, "Unfortunately, I underestimated just how bad the relations were. I think the one thing I accomplished when I was there was that we did not surprise you anymore."

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

The three FCC nominees revealed their views on the regulation and deregulation of cable television, high-definition TV (HDTV) and whether the regional Bell holding companies should be given more business flexibility.

Regarding the issue of freeing the RBHCs, Sikes said he did not favor lifting all of the restrictions in the Modified Final Judgment. "I think it is very hard to say what companies can do and cannot do in an area that is changing rapidly," he explained.

Sikes said he did not favor lifting all of the restrictions in the MFJ.

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Barrett was more candid, saying that his home state, Illinois, supports lifting some of the prohibitions, though he does not want to deregulate the RBHCs. Marshall wisely said she prefers that the Congress give the FCC some guidance.

Turning to cable TV regulatory issues, Marshall said, "I share your concerns about the monopoly power of cable. I would like to study it carefully."

Sikes said he would study the problem under the direction of the 1984 Cable Act, which instructs the FCC to evaluate the impact of deregulation on the cable TV industry.

Barrett favors telephone company entry into the cable TV business.

Regarding HDTV, all three commissioners supported a congressional desire that the U.S. be able to compete with Japan in HDTV development and in the creation of HDTV standards.

The Patrick administration has now departed, and the new Sikes administration has taken up the policy-making reins. Sikes has already named several of his top advisers, Chief-of-Staff Charles Schott, Senior Legal Advisor Kenneth Robinson, Telecommunications Advisor Cheryl Tritt, General Counsel Robert Pettit, Common Carrier Bureau Chief Richard Firestone,

Mass Media Bureau Chief Roy Stewart and Legislative Affairs Director Linda Townsend Solheim. All are lawyers and several are experienced bureaucrats.

Despite his experience, it will take Sikes some time to take full control of the FCC and its policy-making agenda. Nonetheless, the new Bush FCC is perhaps the most experienced ever. It overflows with policy-making expertise, which is quite unusual in industry regulation; most presidential appointees have little or no knowledge of the industries they are expected to regulate.

All three new FCC members are talented and knowledgeable. Sikes has owned radio stations and, in the early 1970s, was a consumer advocate in the cabinet of former governor, Sen. Kit Bond (R-Mo.) Since coming to the National Telecommunications and Information Administration in 1986, Sikes has directed reports on freeing the RBHCs from the line-of-business restrictions in the Modified Final Judgment, telephone company cable TV cross-ownership, international trade in telecommunications equipment and services, price caps, and where the telecommunications and information industry should be by the year 2000.

Barrett, the first state public utility commissioner ever to serve on the FCC, has regulated telephone companies and other public utilities in Illinois for the past nine years.

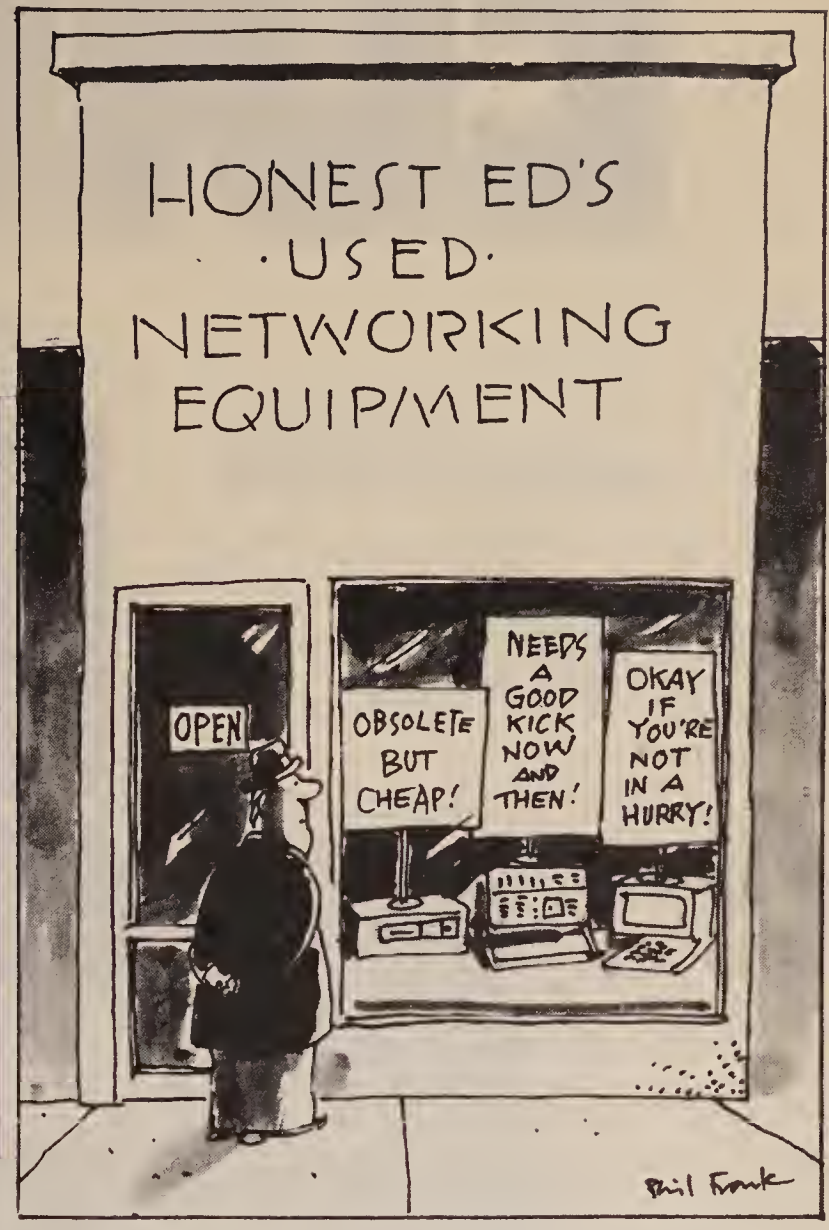
Finally, Marshall has a great deal of policy-making expertise from a political perspective. She was a Senate and White House staffer and worked at the Federal Election Commission as well as the FCC.

Because of their combined talent, one telephone company executive observed, "This is the first time the commissioners have known as much as, or more than, the senior staffers."

Unlike the Reagan FCC, the Bush FCC, now almost in place, has found that it must cooperate with Congress. Consequently, the FCC will be more regulatory, not deregulatory. Sikes and his colleagues, however, have a significant amount of policy-making experience and are aware of their important role in shaping the future prospects and prosperity of the industry. Only time will tell whether they will live up to their potential. ■

TELETOONS

BY FRANK AND TROISE



LETTERS

T2.1 made easy

We have been reading with interest the exchange between Joseph Rumolo and Joe Mohen on the puzzle of independent logical unit support. We have been researching T2.1 and independent logical units on personal computers and Personal System/2s in our subarea network.

The $XID=YES$ parameter only means that, after a connection is made, the Network Control Program (NCP) can send and receive XIDs to the physical unit. This does not imply that the node is T2.1, but only allows XID3 negotiation to begin. If XID3 negotiation is successful, then NCP informs the host that the node

is a T2.1. We feel that Mr. Rumolo was close enough and should get his beer.

Now we would like to pose a question: What's the value of being a T2.1 node without an independent logical unit? Answer: Very little. The only value is that T2.1s can negotiate several control parameters such as message

(continued on page 70)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

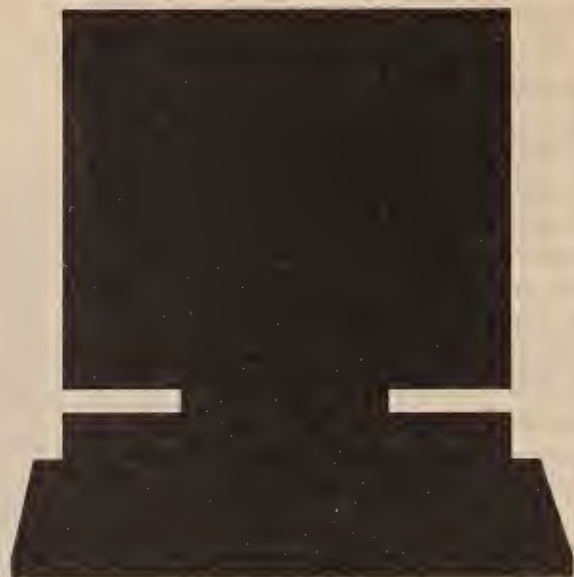
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LAN SERVERS

Tough choices face LAN server shoppers

CONTINUED FROM PAGE 1
pushing hard for market dominance now that 32-bit 80386 microprocessor-based servers are available. They cite power, longevity and application portability as reasons for choosing Unix. But there are problems with Unix that they don't mention. Those will be addressed in this feature.

The need for and advantages of local net servers are well understood. They reduce the number of resources required, and they simplify network design since only the server need be addressed, not each individual component. This simplification is es-

pecially advantageous with communications servers, since the host need only poll the server and not every attached workstation or computer ("Opening the OS/2 gateway," *NW*, June 26).

Configurations

When configuring servers, users have several choices: dedicated or shared-function personal computers, dedicated high-performance servers, distributed servers, or minicomputer or host-based processors. A popular server configuration calls for the shared peripheral, such as a printer or modem, to be attached

to a host personal computer through serial or parallel interfaces.

In some cases, the host personal computer is dedicated to only server functions, while in others, it also performs other duties. If considerable interaction is anticipated between users and the data base resource, it's a good idea to dedicate the personal computer because the operating system may not support multitasking.

Dedicated servers have their own microprocessors, local net operating system and the software needed to control the at-

tached resources (see Figure 1, page 44). They also contain memory that is used for caching and queuing to busy resources. The local net operating system helps transform what normally would be a dedicated peripheral into a shared multiuser device by establishing resource access queues and providing menus and directories for accessing the resources.

Users are also greatly interested in distributing server functions around the network to increase efficiency and eliminate hardware and software redundancy. For example, the data base could

be spread among several servers or hosts instead of centralizing it at one location. Such distribution places certain data base elements at locations where they're frequently used, and it permits access by remote users.

Some companies are using minicomputers and large host processors as file servers. By doing so, they can avail themselves of the mass storage, processing power and efficiency of the operating system available on those computers. Typical host connections are made through gateways that emulate components, such as the IBM 3174/317X control-

lers and workstations, or through direct interfaces using LU 6.2/PU 2.1 protocols.

Resource distribution

Gateway services were once accomplished strictly through terminal controller emulation. But many users object to that because it reduces the personal computer to dumb terminal status. Figure 2 on page 44 shows several distributed resource communication schemes. Local net bridges have become a popular choice for resource sharing across a local net but, as with all servers, performance degrades

as traffic volume increases.

Some companies are now offering software that gives individual users direct access to desired resources without emulation. IBM's LU 6.2/PU 2.1 protocol, which permits peer-level communications, and 3Com's Demand Protocol Architecture (DPA) for 3+Open are good examples. DPA furnishes gateway services without actually using a physical gateway device.

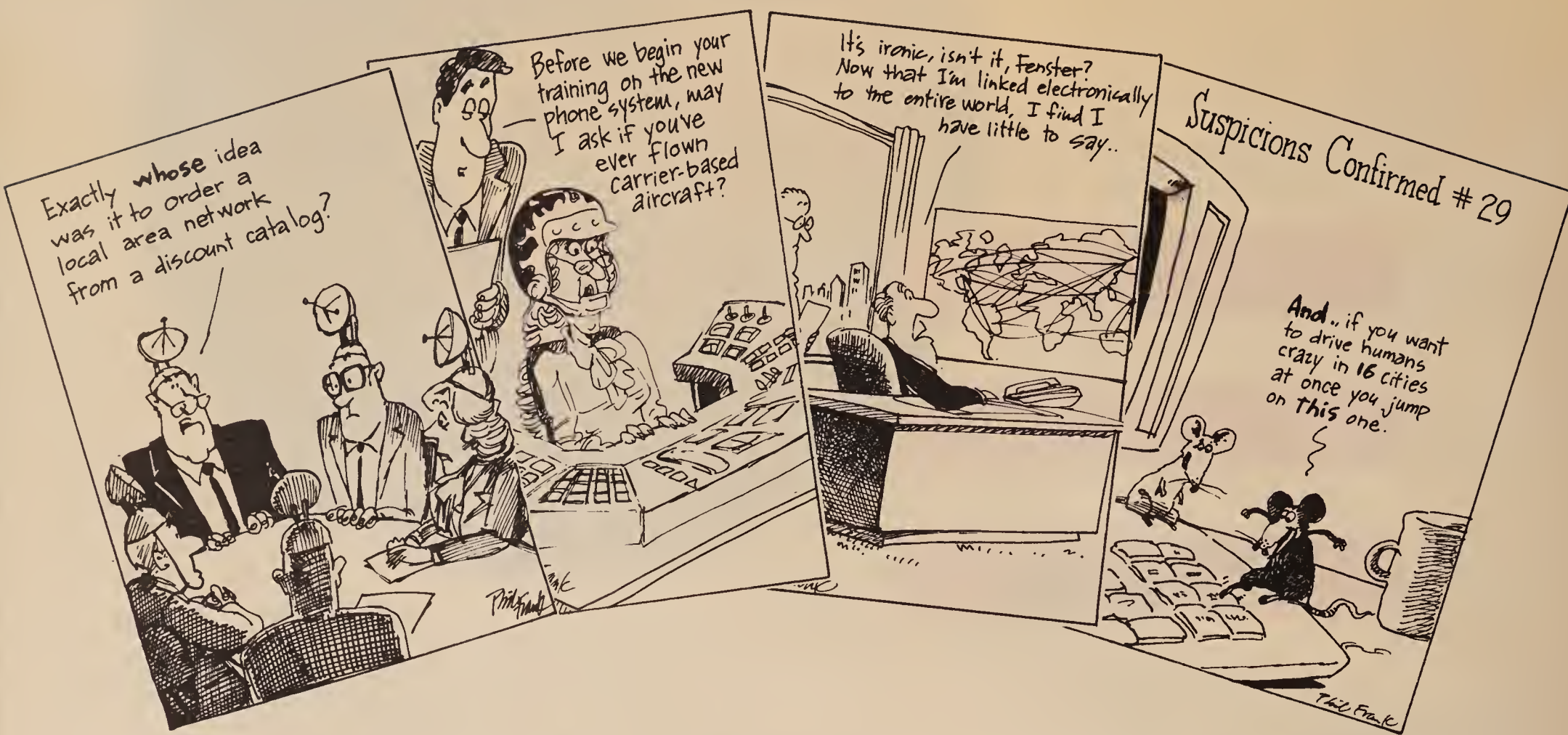
According to Allen Kessler, director of marketing for the Distributed Systems Division at 3Com, DPA does a user-demand load of the appropriate protocol

as opposed to keeping gateway software permanently resident in random-access memory. "Currently, we can communicate with hosts supporting TCP/IP, [Xerox Corp.'s Xerox Network Systems], anything written for Berkeley sockets and [Distributed Link Control/NETBIOS Extended User Interface]; OSI will be out later on," he says. LU 6.2 is not supported; however, it can be supported through the 3+Open Maxess product.

IBM made a major move in interlocal net and interhost connectivity with its Model 8209 LAN
(continued on page 43)



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(continued from page 41)

Bridge, which was announced Sept. 4. The new bridge supports Transmission Control Protocol/Internet Protocol access to IBM's Application System/400 and operates as a bridge between 802.5 token ring, IEEE Ethernet 802.3 and Ethernet Version 2 local networks. (Hewlett-Packard Co. and Ungermann-Bass, Inc. also have Ethernet-to-token-ring bridges.)

The 8209 LAN Bridge supports 4M and 16M bit/sec transmission speeds. IBM will also accommodate Ethernet adapters from 3Com, Ungermann-Bass and Western Digital Corp. on its token ring under OS/2 Extended Edition. However, "Vendors must write their own bridge code," according to Alistair Watson, a local net systems architect with IBM's local network server development group in Austin, Texas.

Several products are available for wringing more functionality out of each unit. Banyan's VINES/386 4.0, for example, allows an IBM Token-Ring Network to be divided into smaller subnets without using dedicated bridges.

According to Barry Burke, Banyan's manager of product planning, VINES/386 4.0 emulates seven token-ring bridges.

All aforementioned configurations have limitations, but their severity frequently depends on the applications being run. For example, using an MS-DOS or PC Network-controlled personal computer as a file server will prove unsatisfactory if a high degree of interactive traffic is anticipated or more than one task at a time is required.

"MS-DOS is single-tasking and not suited for those [high-frequency interactive] applications," says Gail James, president of LanQuest Group Corp., a San Jose, Calif., consulting firm that evaluates local nets. MS-DOS isn't multiuser either and thus can't handle applications that require segmenting functions while operating on them simultaneously. Microsoft Corp.'s OS/2 is multitasking but not multiuser.

Two of the most discussed and dissected local net operating systems around are Microsoft's LAN Manager and Novell's NetWare. Both function on servers with an

as fast as previous OS/2 releases. HPFS attains its better performance by storing files and directories physically closer on disks and by placing an entire file and di-

depth evaluation of enhanced OS/2.

However, HPFS is going to get stiff competition from NetWare with its highly lauded directory hashing and elevator seeking,

them with current read/write head positions and services the request to minimize head movement.

Brian Valentine, engineering manager for Microsoft's networking business unit, confirms that elevator seeking is not part of the standard LAN Manager, but "if the disk controller used supports elevator seeking, it can be implemented. If people want that facility, we can also furnish it on a custom basis." As for directory hashing, Valentine says extensive directory caching is part of LAN Manager. With directory hashing the most frequently used disk addresses are placed in a subdirectory and mapped to cache memory. Other systems employ memory caching, whereby the most frequently called records are held in cache memory.

(continued on page 44)

Two of the most discussed and dissected operating systems around are LAN Manager and NetWare.

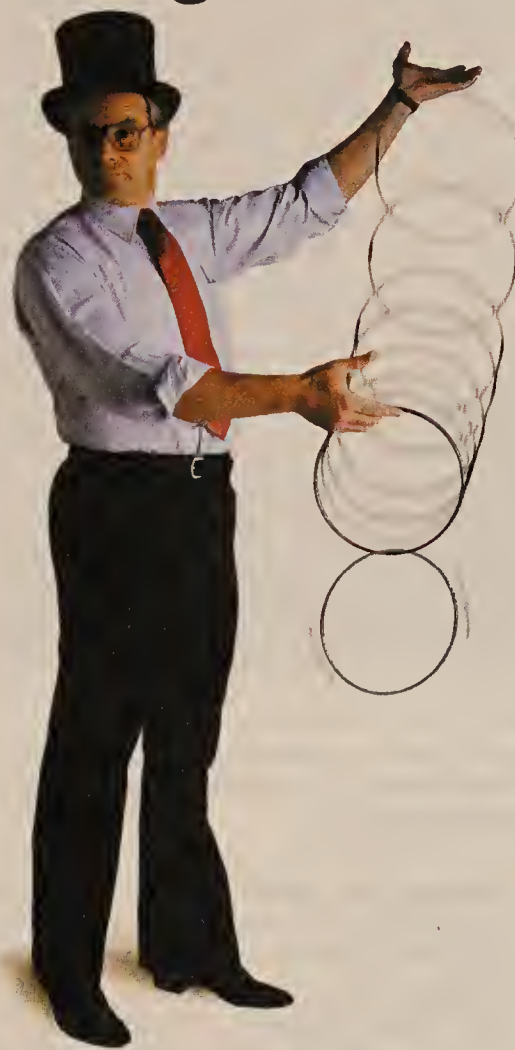


rectory in cache memory. Therefore, it takes less time to locate files on the disk.

None of the local network testing houses contacted has completed an in-

both of which significantly decrease data retrieval times. With elevator seeking, the disk controller program examines multiple I/O requests at one time, compares

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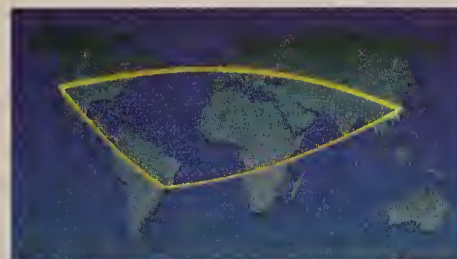


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"MS-DOS is single-tasking and not suited for those [high-frequency interactive] applications."



Intel Corp. 80286 hardware platform and have their exponents and detractors.

"For file server applications, we found NetWare 2.86 to do a better job handling small data blocks, while LAN Manager is better at large blocks," James says. However, he was unable to define "small" and "large" because the analysis was performed for 3Com.

A 3Com spokesman declined to furnish the figures because "the tests were performed on an early version of LAN Manager 1.0, and the findings are no longer relevant in light of the enhancements made."

Users that have run OS/2 have reported slow data retrieval times, although 3Com press releases report that the new OS/2 Standard Edition with the High Performance File System (HPFS) is about twice

(continued from page 43)

James says he thinks Novell has done an outstanding job with hashing and elevator-seeking but thinks the company opened a can of worms with its verify-before-write-to-disk feature, which ensures that data is not written to bad sectors.

"In doing delayed writes, everything is saved to cache memo-

cation program interface] so 32-bit applications can be used, as can a full 32-bit address. Users won't be restricted to 64K-byte blocks as is the case with 16 bits; you can have a 1M-byte buffer. Release 2.0 will let users run a 16-bit API if they want to."

Katherine Barrett, manager of the systems engineering group with Ernst & Young's Network

months to learn."

In addition to the alleged difficulty with commands and no single standard for Unix, opponents point out that a standard operating system and hardware platform such as DOS and the IBM Personal Computer is also lacking. The lack of standards will likely inhibit Unix from being embraced by horizontal markets, as is now the case with DOS and the IBM and Apple Computer, Inc. Macintosh hardware platforms.

Without a hardware platform and operating system standard, application developers must release several versions of the same application, and many will be unwilling or unable to bear the expense for development and testing. Thus the so-called "shrink-wrapped" software that propelled the DOS/personal computer combination into many offices will not be there in the same magnitude for Unix.

OS/2 hasn't taken the office by storm either, because most application developers are not writing applications for 286-based machines. Some industry experts feel that application developers have written off the 80286 and are concentrating on OS/2 Release 2.0 and the 80386. "They aren't doing 286," states Burns. "They're writing for 386, and I expect applications sometime next year."

James sees no reason for the delay. "It's no big deal to convert an application written for 286 to run a 386; it was simple enough for NetWare 386," he asserts.

Hardware progress

If operating systems play the leading role in server efficiency and power, the hardware platform is the supporting player. The shortcomings that plague personal computer-based 80286 servers — for example, slow microprocessors, limited I/O channels and slow bus speeds — are well known. Users with high traffic rates usually shun them in favor of specialized servers, minicomputers and large host mainframes.

For companies looking for high performance without involving the mainframe, NetFrame Systems, Inc., Parallax Computer, Inc. and Compaq Computer Corp. are readying servers that use multiple 80386 and 80486 microprocessors and several I/O ports to balance traffic to RAM and attached resources.

All three support DOS applications, and industry-standard buses or adapters attach to the multiple channel buses to ensure compatibility with standard peripherals. (Zenith Data Systems Corp. also has a multiple-microprocessor server for Unix that supports 16 IBM Personal Computer AT standard adapters.) The Compaq unit uses the Extended Industry Standard Architecture bus, allowing it to run existing AT adapters, and the Parallax machine attaches to IBM's Micro Channel bus.

3Com also has a line of 80386-based servers, called the 3S/500, which provide separate memory paths for the processor, disk storage and I/O devices. The new server line runs at 20 MHz and can be used for applications that distribute tasks among servers.

Coprocessors have been longtime favorites for off-loading graphics and computer-intense applications from single-processor machines. There are boundless numbers of coprocessors on the market, but the Intel Model 82596 is one of the more powerful ones. Introduced in June, it provides full 32-bit processing independent of the local net server processor and allegedly operates at 100% of the system and serial bus bandwidths.

The 82596 can be embedded on the system board, obviating the need for additional interface logic. The coprocessor and local net interface system are isolated by a 192-byte internal buffer and both operate with Intel i860-, i486-, 386DX- and 386SX-based systems, as well as their 80960 and 376 embedded processors.

Critical interface

While high-performance servers boast speed and power, especially those using 80386 or 80486 processors, the disk controller interface could cause data bottlenecks. The ST-506 controller used with 16-bit buses, like that used by the 80286, has a 165K byte/sec data transfer rate, which is plenty fast enough for

needed by 32-biters," agrees Infonetix' Burns.

The principal difference between the competing interfaces is that SCSI is a smart controller and ESDI is not. SCSI is considered intelligent because each device attached to the SCSI bus has its own controller and microprocessor. An SCSI adapter port can connect a mix of seven peripherals composed of Winchester hard disks, printers, scanners, backup tape units and optical disks. Those units are daisy-chained, so only the card slot for the SCSI adapter is required to accommodate all seven units.

ESDI does not support such peripheral configurations. While interviewees agree that SCSI is the interface of choice, LanQuest's James also sees a role for ESDI. "ESDI does a better job handling small record transfers, while SCSI is better for large ones and if you have multiple disks," he says.

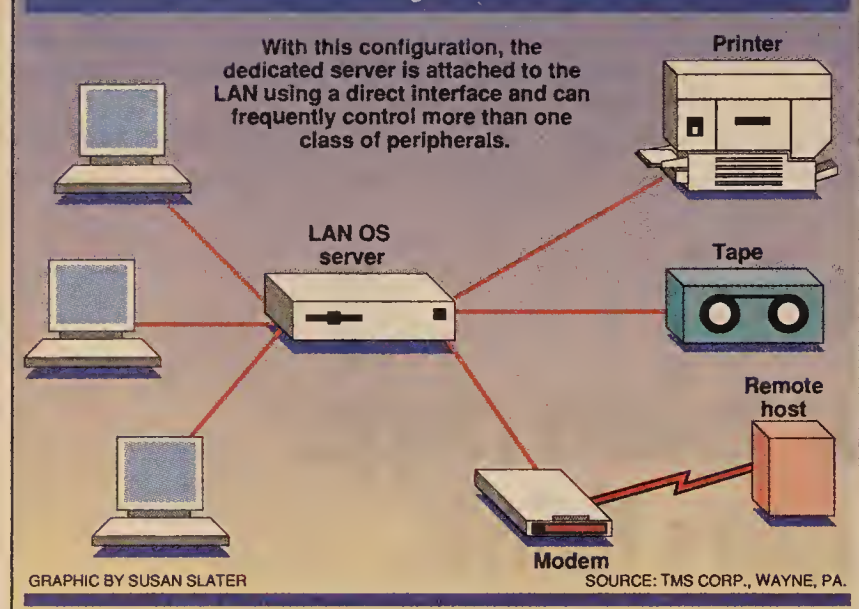
One factor that might slow SCSI's market domination is the lack of standards, which has led to vendor-proprietary codes being used on different attached devices. Therefore, a good deal of incompatibility exists. However, the ANSI SCSI-2 committee is working on a new set of codes for ANSI member ratification.

Host-based server

A growing number of users are looking at minicomputers and large hosts to furnish local net server functions. The operating

Stand-alone server hosting multiple resources

Figure 1



ry until CPU cycles are available to save data to disk. If a power failure occurs before writing, users may lose records they believe they've saved," James explains. "Therefore, users may be forced to use uninterruptible power supplies." He adds that he feels transaction processing and data writes have the highest risk but that unless heavy record processing is being performed, it might not be too difficult to recover from a power loss.

Unix contends

Unix is another operating system frequently cited for server applications. It's multiuser and multitasking, supports DOS applications and is a proven performer. Banyan is among the many vendors using Unix, which has been the heart of VINES for several years. Since Unix has been in use for several years, sophisticated facilities for handling multiple architectures have been developed for it. A VINES server, for example, can communicate with a server using TCP/IP and another using X.25.

Unix also uses the 32-bit instruction set in native mode on the 80386 microcomputer, while DOS and OS/2 still are saddled with 16-bit 80286 code. It has been rumored that OS/2 Version 2.0 Presentation Manager, used with the 80386, will employ 16-bit addressing for services such as file transfer; to compensate for that, the operating system will use an interpretive layer that converts 16-bit program calls into 32-bit calls. Such conversion will increase overhead and could possibly degrade overall performance.

However, Valentine says, "That's not the way Release 2.0 works at all. It has a 32-bit [appli-

Strategies consulting practice in Fairfax, Va., says she can't comment on OS/2 Release 2.0 because, like most people, she has yet to see it. But even if the 16-bit addressing were true, it "likely will have an adverse effect on file transfer and data manipulation, and it might increase data search times. But it will not cripple overall operation," she says.

Unix proponents also point out that many Unix-based application programs are available (about 20,000 vs. a relative handful for OS/2) and that the applications can be easily ported to other computer systems running Unix. That's not entirely true, though, because there's no single standard for Unix. Versions of Unix running on different hardware platforms likely will not be identical to one another, and, therefore, some systems services may not be available across those platforms.

Hampered acceptance

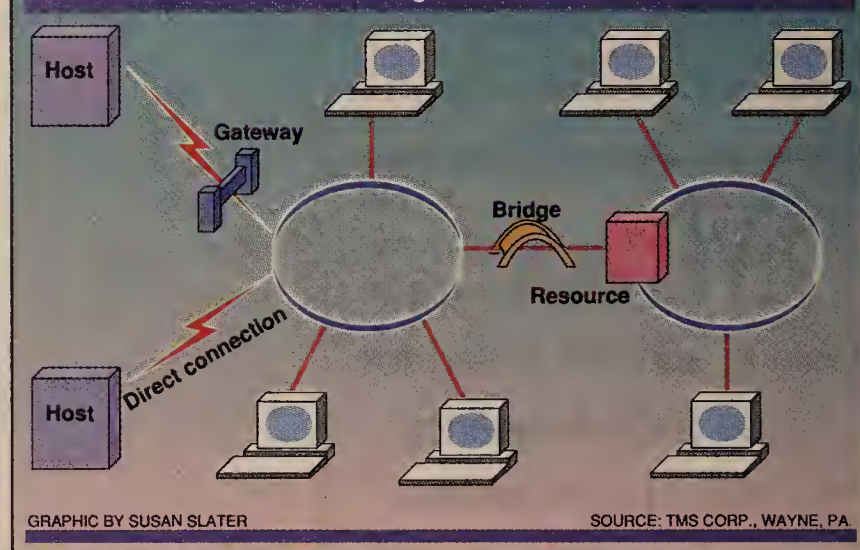
One factor that has hampered Unix's acceptance as a server operating system is its user interface. While Banyan's interface has done a good job of masking those commands from users and AT&T offers something more palatable with its Open Look graphical interface, straight Unix commands are a bit much for some users.

"Some people have a real problem with Unix commands, especially those who have worked with DOS," states Nina Burns, vice-president and senior consultant with Infonetix, Inc., a Santa Clara, Calif., consultancy that also tests local nets.

Barrett agrees. "[Unix] was made for people using bigger machines, and it's still not user-friendly. It takes a good six

Typical connection schemes for distributed processing

Figure 2



disks with 40 msec access times. But high-speed 80286 and 80386 processors run at 20 MHz and 33 MHz clock rates respectively, and they use disks with 20 msec or lower access times. If the controller can't keep up with the needed transfers, the performance will degrade noticeably.

The more popular high-performance peripheral interfaces are the Enhanced Small Device Interface (ESDI) and the Small Computer System Interface (SCSI), both of which can handle 2M- to 4M-byte transfer rates. SCSI appears to be the interface of choice. "It's definitely the interface of the '90s," opines Banyan's Burke.

"SCSI has the performance

systems are multiuser and multitasking, and the mainframe is better for graphics and number-crunching applications, they reason.

Novell will make significant progress in bringing local networks and mainframes closer together when its Portable NetWare product hits the market later this year. Versions of Portable NetWare will be available for 80386 and Motorola Corp. 68000 microprocessors and will support Unix, OS/2, Macintosh and MS-DOS devices.

According to Novell, with Portable NetWare, users access the host as if they were accessing a Novell file server. Typical server-

(continued on page 46)

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(continued from page 44)
based applications such as SQL can be used by storing data base files in NetWare file format on the mainframe.

Portable NetWare also permits users to link to host-based terminal-emulation software to access host applications. Data General Corp., NCR Corp., Prime Computer, Inc., Sun Microsystems, Inc. and Unisys Corp. are among the mainframe makers indicating support for the Novell system.

Infonetics' Burns says she believes users will welcome host-based servers. "People want it; it's very good for compute-bound applications," she states. Burns, however, isn't sure about the portability of software programs. "Some personal computer programs won't run on the host, and host applications run on personal computers via emulation; that's not efficient."

Barrett says users will prefer a transparent interface rather than emulation. Peer communication "is more efficient, and people are looking for more efficient

lar to Digital Communications Associates, Inc.'s Irma card, which emulates IBM 317X equipment.

"Those [remote users] aren't connect-

Barrett says users will prefer a transparent interface rather than emulation.

▲▲▲

ways to share data," she states.

Another case can be made for using the host as a server if the network consists of remote users employing something simi-

ed to the LAN and, therefore, have no access to the server," states Jay Casler, director of technology for Tangram Systems Corp., a Cary, N.C.-based software devel-

oper. "When you move the server functions to the host, those people [using emulator hardware or software] can access the relevant software programs." Tangram recently announced host-server functionality for its Arbiter product, and it also offers peer-level communications using LU 6.2.

Distributed processing

The efficient use of resources is also a driving force behind distributed local net systems. One reason for distributed processing is to concentrate portions of a data base at locations where it's most frequently used rather than centralizing it. Some people also think distributed processing means using a single server with multiple independent channels, which routes requests to separate processors, as is the case with Compaq, 3Com, NetFrame and Parallax systems.

Distributed processing, however, doesn't mean passing processing chores from the workstation to the server; rather, it involves a client/server environment where both parties perform the part of the application they do best. For example, a file server running a powerful multiuser, multitasking operating system and high-speed hardware is better suited to handle data base updates and retrieval than a workstation running PC Network. But it would be wasteful to use the server for routine processing.

Distributed processing doesn't mean passing processing chores from the workstation to the server; rather, both parties perform the part of the application they do best.

▲▲▲

The products most frequently mentioned for distributed processing, aside from NetWare, are LAN Manager and IBM's LAN Server. Stories are circulating about LAN Manager's shortcomings in a distributed environment. OS/2 is said to impose no data access restrictions on OS/2 applications running under LAN Manager. The lack of such restrictions is alleged to allow remote users to copy files with no security checks whatsoever when LAN Manager's Net Run command is used. That, in turn, opens the door for data theft or illegal alteration.

Microsoft refutes those allegations. "They're absolutely untrue," says Valentine. "Run Path sets up a path for the executable file and the network administrator determines what operations users can perform. If [users] are not given a [file] copy or alter authority, they can't do either one," he continues.

Some industry observers claim that an unauthorized remote user could steal the password from an authorized remote user, dial in and do whatever damage they desire. "That can't happen [because] Net Run only works with locally attached terminals; it doesn't permit connections when a modem is involved," Valentine says.

(continued on page 48)

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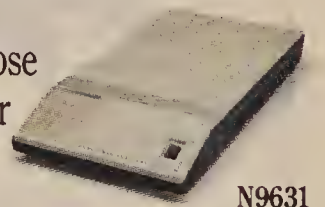
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IBM has taken similar measures with its LAN Manager but implements the controls differently.

"We've made changes to the [data] access mechanism," says Watson, "and the types of [data manipulation] permission are similar to what is now used with [Resource Access Control Facility] in that users are given permission to read, write, alter and update."

For users that are concerned with data integrity and are not planning to use LAN Manager/Server, the SQL data base has very sophisticated facilities. The SQL server is based on the client/server concept.

Unlike traditional data base systems that route the entire file over the network to the workstation, SQL servers process the user query against the data base and return only the results.

The application dictates the best server to choose. Small offices wanting only to share a printer can get by with Microsoft Corp.'s MS-Net, unless everyone tries dumping large print files simultaneously. Then, print queues are required, and that means disk and print management software are needed.

Companies that want their server to perform several functions, such as printer and modem

sharing, require another level of complexity.

Summary

Generally, when the server must handle more than one shareable device, the server must be dedicated and the software must be able to manage the traffic and resources.

Users with large local networks face tough decisions in choosing hardware and software

platforms since each has its own advantages.

Is it better to choose a simple, inexpensive 80386-based server and a fast I/O interface such as SCSI to handle resource sharing, or a more expensive unit that uses multiple I/O paths with each served by its own processor?

As for local net operating systems, should users choose a proven performer such as Unix and hope all the talk about unfriendly interfaces is untrue? Or should they hope that OS/2 Release 2.0 and LAN Manager have no hidden alligators?

Even proven performers may not be satisfactory for all applications. Novell's highly regarded NetWare, for example, may not be the choice for large distributed networks.

One consultant, who declines to be quoted directly, says that with NetWare, the user must know the location of each resource and individually log on to each. That's a minor inconvenience for small networks but a



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Unlike systems that route the entire file over the net to the workstation, SQL servers process the user query and return only the results.



major one for large networks.

Novell, however, says that's not entirely accurate. Chance Williams, supervisor of Novell's distributor support group in Provo, Utah, says each server has a list of users and each user has predefined servers that are automatically connected after logon.

Ease of use

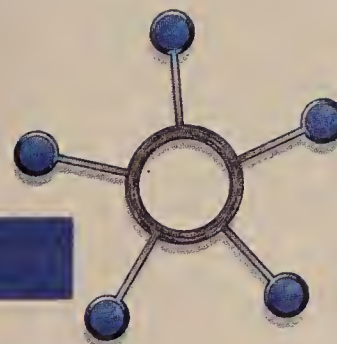
"Users need only know the name of the server they're logging on to, and associated [server] connections are established automatically," he explains.

Williams adds that each user can have only eight servers active simultaneously; if more are needed, the user must log off and then log on to the desired unit.

"If that's unacceptable, people can run PC MOS [from Software Link, Inc.], which permits 16 interfaces, and each has eight associated servers. PC MOS is multitasking so users needn't log off the established NetWare session to access the other servers," he says.

Yes, choosing a local network server can certainly be confusing. ■

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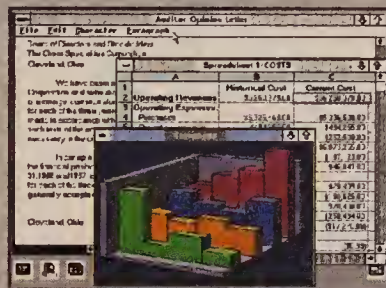
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Misconceptions vs. reality

By WILL COLLINS AND KATHRYN KOROSTOFF

Part 2 of a two-part series on Open Systems Interconnection Management.

OSI Management offers many potential benefits and raises many long-term strategic issues. Part 1 of this article examined the progress that has been made in the different areas of OSI Management.

Currently, the parts of OSI Management are described and defined in six modular units, which are being developed by international standards committees. One of these committees is ISO/EIC JTC1/SC21/WG4, which is the International Standards Organization's (ISO) international standards committee for OSI Management. Participating in that committee on behalf of the U.S. is ANSI/ASC/X3T5.4.

(continued on page 55)

Collins is chairman of the ANSI/ASC/X3T5.4 OSI Management Committee, chartered with developing U.S. positions on Open Systems Interconnection Management protocols for the International Standards Organization. He is also a consulting engineer at Canton, Mass.-based Codex Corp. Korostoff is a market analyst manager at Codex.



Despite widespread misperception, the set of standards and specifications comprising OSI Management are healthy and rapidly approaching maturity.

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(continued from page 53)

To understand the complexity and variety of functions being developed by the ISO committee, we must examine the two remaining areas: the Systems Management Functions (SMF) documents and the Functional Area Documents (FAD).

SMFs

SMFs carry out the management processes, or activities, specified by the various Specific Management Functional Areas (SMFA). Each FAD specifies which of the SMFs are used by the various SMFAs. For example, a state management SMF is used by the fault management and configuration management SMFAs.

Currently, seven SMFs are defined in the SMF document (see Figure 1, page 66). They are:

■ **Object management.** This uses OSI services, such as those specified in the Common Management Information Services (CMIS) standard, to perform actions on managed objects. These actions include creating, deleting and renaming managed objects. For example, the management function Object Management may invoke the CMIS service M-DELETE to delete a managed object from an open system.

Within the Object Management definitions, services are specified that allow reports about Object Management activities to be communicated to other open systems. For example, an attribute change event report service can be used to send an event report to another open system if an object's attributes change.

■ **State management.** This describes services that allow the OSI Management user to monitor the past state of managed objects and receive notices, or alarms, in response to changes in the state of managed objects.

The State Reading service uses the M-GET service of CMIS to retrieve information from managed objects. For example, M-GET may be used to retrieve an indication of whether or not a managed object is accessible by the management system.

The State Change Reporting service calls upon the attribute change event report service of Object Management to notify users of changes in either the administrative or operational state of managed objects.

■ **Relationship management.** This describes services that create, delete, change and report relationships among managed objects. Relationships among managed objects is a complicated issue.

In general, a relationship is a set of rules that describes how the operation of one managed object affects the operation of another managed object within an open system.

For example, two managed objects in an open system may have a relationship in which one is activated in the event that the other fails as a result of a fault

management diagnostic.

■ **Error reporting and information retrieval.** This allows various types of information to be reported and retrieved through the open system.

Descriptions of error types, probable causes and measures of severity are specified. This type of functionality will be essential in integrated network management scenarios where users have more than one network in place.

For example, a single network management system's ability to access information about errors occurring in two open systems could be important in situations where a relationship exists between the two open systems.

Types of errors defined by this SMF are: communications failure, quality of service failure, processing failure, environment failure and equipment failure. Error reporting services for each type

of error are defined in this SMF.

Probable cause information provided by this SMF would indicate the problem that results in an error.

For example, in the case of a communications failure, a probable cause might be a call establishment error.

Five severity parameters are defined: indeterminate, critical, major, minor and warning. In a network management applica-

tion of this SMF, the ability to categorize alarms by severity helps the network manager decide quickly which alarms must be responded to immediately and which ones can wait.

This SMF uses the CMIS service M-GET to perform information retrieval.

■ **Management service control.** This describes services that allow the management system (continued on page 57)

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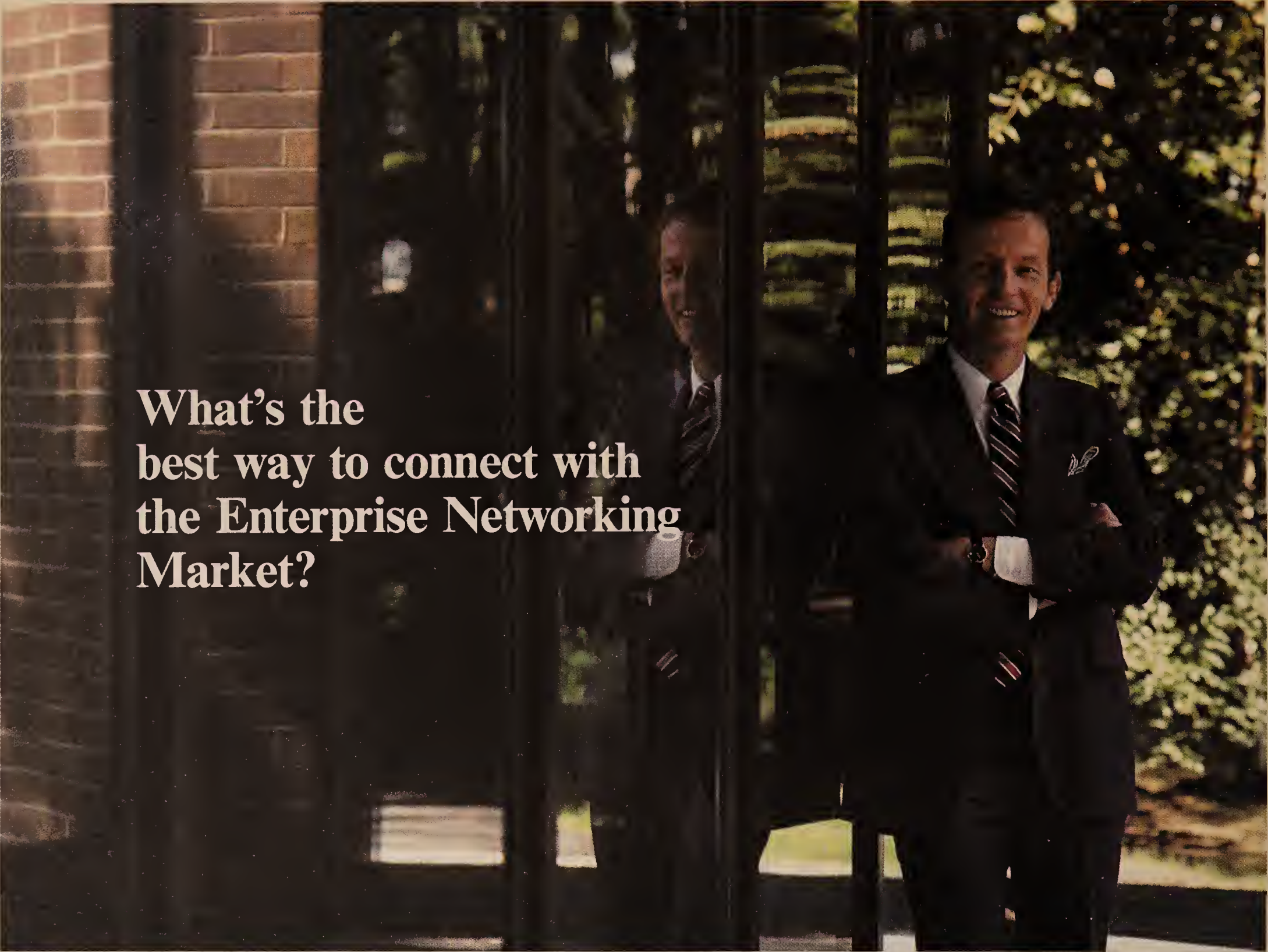


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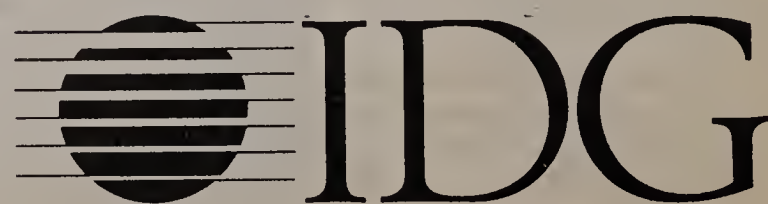
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Answers for the Information Age.

(continued from page 55)

user to determine which event reports are to be sent where.

For example, this SMF could play a key role in network management systems scenarios by allowing the network manager to specify which information can be exchanged between Manager Processes and Agent Processes. Consider a scenario in which a user has one Manager Process that centralizes management of multiple separate Agent Processes (see Figure 2, page 66).

As the figure illustrates, the Management Service Control functions will allow the user to choose which types of event reports will be exchanged between the Manager Process and the individual Agent Process.

■ **Confidence and diagnostic testing.** This allows tests to be performed on managed objects. The purpose of such tests is to allow the management system to determine the quality of services and to assist in the diagnosis of faults within the open system. For example, this SMF might be used to initiate bit error rate tests on remote modems.

■ **Log control.** This service allows users to choose which event reports the system will log. The log control function also enables an external managing system user to change the criteria used for logging event reports.

The application of the log control function in a network management scenario is very important. The network manager wants the ability to specify which events should be logged, but the ability to add or delete event reports to be logged is also very important. For example, the user may want to log only critical event reports, but at a later date, perhaps the need to track all reports on a historical basis will become important.

These descriptions of the management functions detailed in the SMF documents verify that the X3T5.4 committee has made substantial progress toward providing a powerful set of OSI Management tools. The potential benefits of using these functions as applications in a network management system are obvious: The reality of integrated network management is within reach.

The accompanying chart shows the current status of the SMFs. While four of the seven SMFs are still draft proposals, their advancement to draft international standard status is expected by 1990 (see "Status of SMFs," this page).

FADs

The various functional areas are defined within the OSI Management Framework standard document. In addition, a FAD for each SMFA describes the OSI Management tasks that the functional area provides, the set of specific management functions that are necessary for the provision of the functional area and the procedures associated with

the use of these functions.

■ **Configuration management.** This is a set of functions that can control and retrieve information from managed objects. These functions include the ability to define and name managed objects; the ability to create, delete and modify relationships among managed objects; the ability to change the operating state of a managed object, including creation and deletion; and the

ability to receive and respond to requests for information about managed objects.

Configuration management's associated management functions are object management, state management and relationship management. It has working document status.

■ **Fault management.** This is a set of functions that detect, isolate and correct abnormal operation. (continued on page 66)

Status of SMFs

Title	Status
Object management	Draft proposal
State management	Draft proposal
Relationship management	Draft proposal
Error reporting and information retrieval	Draft proposal
Management service control	Draft proposal
Confidence and diagnostic testing	Working document
Log control	Working document

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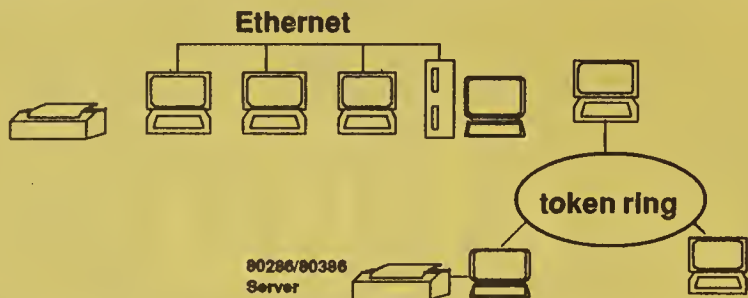
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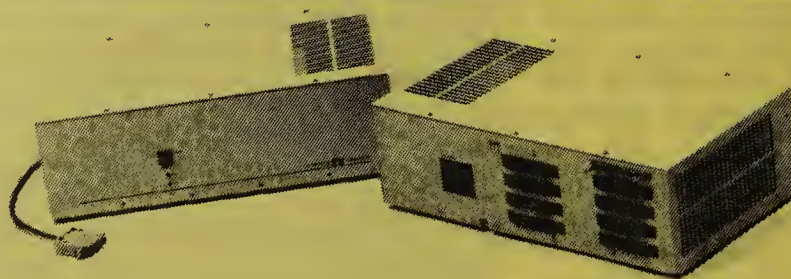
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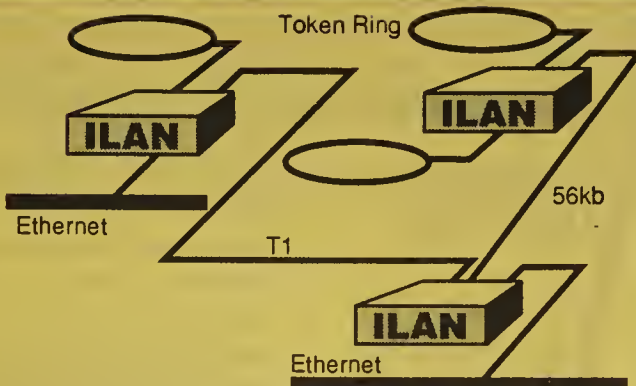
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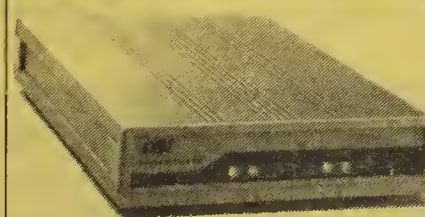
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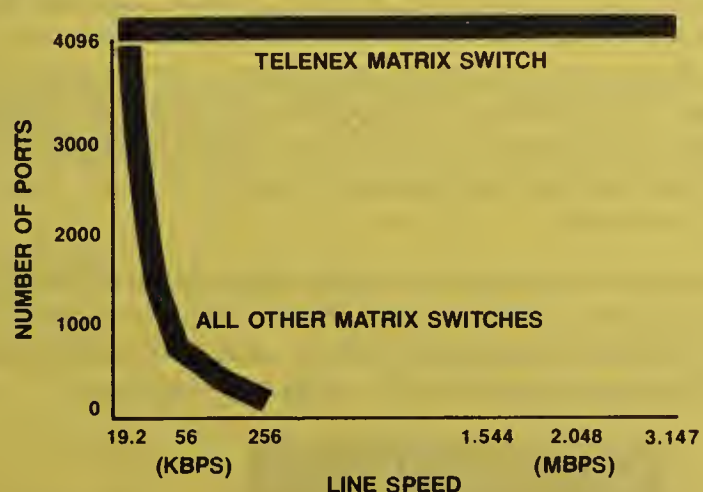
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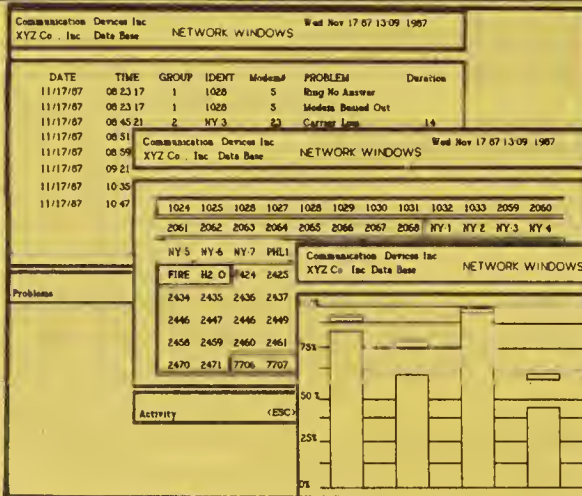
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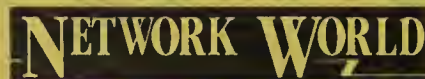
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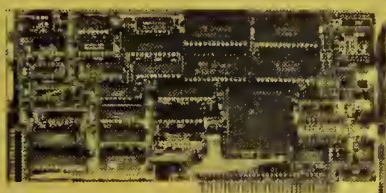


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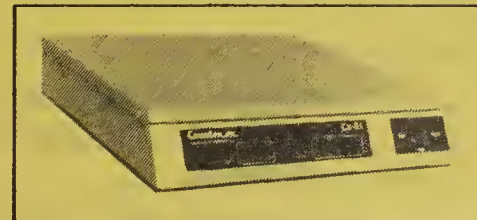


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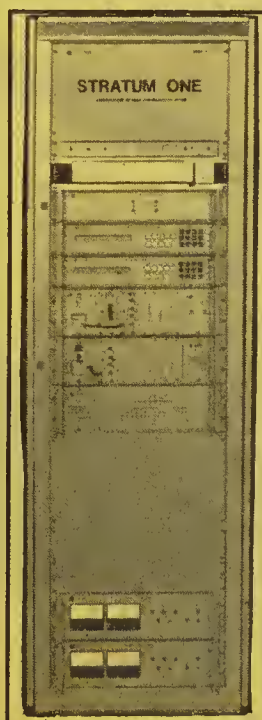
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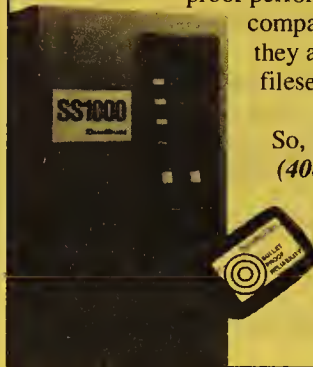
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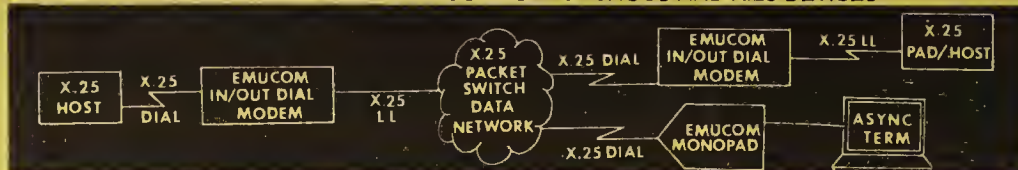
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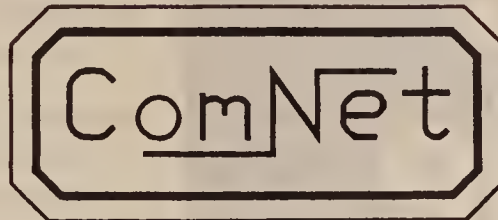
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tions in the open systems environment. This includes accepting error notifications, tracing error sources, maintaining error logs and performing diagnostics.

Its associated management functions are management service control, confidence and diagnostic testing, and error reporting and information retrieval. Fault management has working document status.

■ **Performance measurement.** This is a set of functions that monitor the performance of an open system. These include a work load monitoring function, a response time tracking function and a measurement summarization function.

Work load monitoring recognizes potential resource overload situations, an important fault prevention function. Response time tracking reports response times and generates warnings in the event of excessive delays. Measurement summarization gathers statistics, over a period of time, about the performance of managed objects.

the ability to set constraints.

For example, in a network management application of this SMFA, a network manager could impose time or expense con-

workshops. For example, the group is developing classes on OSI Management as part of its series of implementors' workshops.

Founded in September 1988, the OSI/Network Management (OSI/NM) Forum is a group of vendors working together to determine how they will actually use the OSI Management standards in their respective network management products. The group's goal is to ensure that the participating vendors develop compatible network management products based on OSI management standards.

The OSI/NM Forum counts among its 40-plus members key players such as AT&T, Hewlett-Packard Co. and Northern Telecom, Inc., but neither IBM nor Digital Equipment Corp. has joined.

The forum's primary accomplishment to date has been the publication of two documents: the OSI/NM Forum Application Services document and the OSI/NM Forum Protocol Specification document. Forum members are using these documents to guide their development of network management products.

In addition to the vendors working toward OSI Management through the OSI/NM Forum, evidence abounds of vendor dedication to using OSI Management applications in their network management products. AT&T and IBM, the two vendors taking the strongest positions on integrated network management, have both stated their intentions to support OSI Management standards in their net management offerings.

AT&T's Unified Network Management Architecture offering has a Network Management Protocol (NMP) designed to be easily changed to the Common Management Information Protocol (CMIP). Thus, when CMIP becomes an international standard, AT&T will upgrade its systems from NMP to CMIP.

In September 1988, amongst a flurry of other OSI-related announcements, IBM stated its intention to offer OSI Management

support in NetView by mid-1990.

Figure 3 on this page illustrates vendor support of OSI Management as a standard for network management products.

Clearly, OSI Management has the potential to yield significant benefits for users interested in network management in general and integrated network management systems in particular. OSI Management provides a rich variety of functions which, if used in network management systems, will provide a powerful set of common services and functions.

For example, OSI Management-based network management products will be able to exchange information with and retrieve information from one another. Users will be able to de-

cedent for the variety of functions network management systems should offer, even if the systems are not OSI Management-based. Thus, all suppliers of network management products will be motivated to develop a full range of functions to match those offered by OSI Management-based systems.

So, what strategic issues do users need to consider?

If integrated network management systems are part of your long-term planning, your short-term planning should include evaluation of vendors that plan to support OSI Management in their equipment and management systems. Do the vendors you are evaluating plan to support OSI Management?

The seven Systems Management Functions

Figure 1

- 1 Management service control function
- 2 State management
- 3 Error reporting and information retrieval management
- 4 Confidence and diagnostic control function
- 5 Object management
- 6 Relationship management
- 7 Log control

SOURCE: CODEX CORP., CANTON, MASS.
GRAPHIC BY SUSAN SLATER

Vendor support of OSI Management applications

Figure 3

Vendor	OSI/Network Management Forum member	X3T5.4 member	Product announcement
AT&T	Yes	Yes	Yes
Codex Corp.	No	Yes	Yes
Data General Corp.	Yes	Yes	Yes
Digital Equipment Corp.	No	Yes	Yes
Hewlett-Packard Co.	Yes	Yes	Yes
IBM	No	Yes	Yes
Northern Telecom, Inc.	Yes	Yes	Yes
Racal-Milgo	Yes	Yes	No
Unisys Corp.	Yes	Yes	Yes
Wang Laboratories, Inc.	No	Yes	Yes

Note: This is not a complete list of vendors supporting OSI Management applications for network management product development.
GRAPHIC BY SUSAN SLATER SOURCE: CODEX CORP., CANTON, MASS.

Performance measurement's associated management functions have not been specified yet; it has working document status.

■ **Security management.** This supports the application and control of security mechanisms in the open systems environment. For example, in a network management scenario, these functions allow users to create security mechanisms that monitor the network and report security-related events to an application.

Security management has working document status. Its associated management functions have not been specified yet.

■ **Accounting management.** This provides functions that allow users to monitor their use of open systems and the costs associated with them.

This SMFA also allows network managers to monitor and store information about user accounts. These functions include

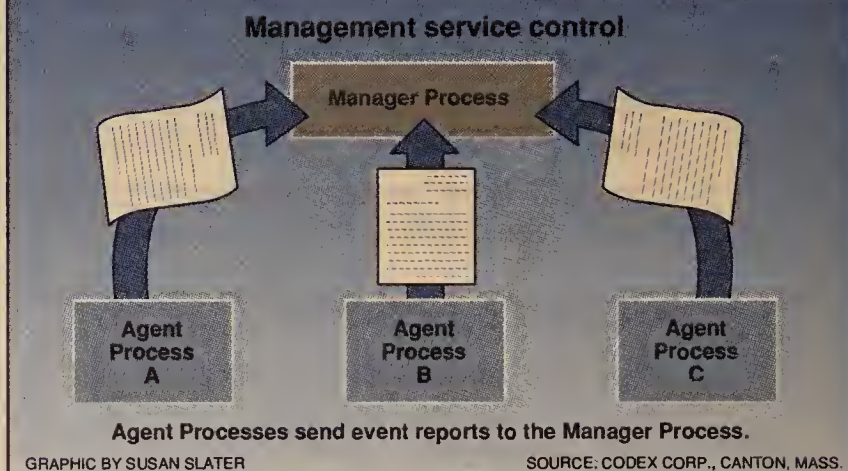
departments. Accounting management's associated management functions have not been specified yet; it has working document status.

A great deal of industry activity surrounds OSI Management. The National Institute of Standards and Technology (NIST) has a special interest group following OSI Management. NIST's special interest group on network management serves as an implementors' advisory resource. NIST runs OSI implementors' workshops as a service to organizations interested in using OSI.

As part of its mission to assist users of OSI standards, the Network Management special interest group is working with the X3T5.4 Committee to support the standards development process. The special interest group is developing implementation agreements for OSI Management as part of its series of implementors'

Hypothetical network management example

Figure 2



cide and change which types of information will be exchanged or retrieved among network management systems.

Also, OSI Management-based network management products will be able to control and manage resources managed by other OSI Management systems. Users will be able to decide and change which commands may be invoked upon managed objects by remote network management systems.

Finally, users will expect to be able to enjoy the same level of functionality from all OSI-based network management products. Thus, vendors will be motivated to provide the full breadth of OSI Management applications in their OSI-based offerings.

OSI Management sets a pre-

And now that you are well versed in the functionality OSI Management can provide, you know what to look for in a network management product. So, when vendors make vague statements about OSI Management support, you can ask specific questions about which SMFAs they plan to support in their network management products.

Figure 4 on this page is a checklist of the five SMFAs. Under each SMFA, specific capabilities are identified. As you read the list, decide what level of importance the capability holds for you. With this list of prioritized capabilities in hand, you will be able to inform your network management suppliers of your OSI Management interests. ■

OSI Management checklist

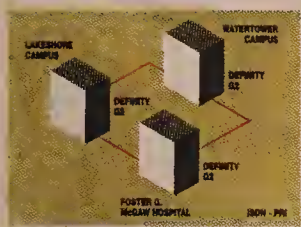
Figure 4

OSI Management functions	Critical	Important	Somewhat important	Not important
Configuration management • Retrieve information • Control managed objects				
Fault management • Fault detection • Fault source determination • Diagnostic testing • Error logs				
Performance Management • Work load monitoring • Response time tracking • Measurement summarization				
Security management • Security mechanisms • Security information reports				
Accounting management • User account management • Cost control mechanisms				

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See it at **FALLWAVE** '89

Letters

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size. A node can be a T2.1 but will appear to be the same as a PU 2.0 in actual functions it performs.

Mr. Mohen is correct in that the ACTPU suppression bit and Control Point (CP) Name are not used as indicators of whether a node is a T2.1 node. While only T2.1 nodes can set this bit and use the CP Name vector, not all implementations use ACTPU suppression or require that a CP Name be provided.

During our research, we have found the IBM manuals both informative and lacking. The NCP reference was very useful in helping us understand how Low Entry Networking was applied, but the installation documentation is one area we found lacking. The manuals' installation guidelines become less useful as the T2.1 network grows. Hopefully, this will be improved in future releases.

Robin Layland
Manager
Steve Simon
Engineering project manager
SNA Software Engineering
Travelers Insurance Co.
Hartford, Conn.

Another gauntlet thrown

Although Mr. Mohen refuses to accept it, the IBM PU Type 2.1 implementation information provided in my previous letters ("A simple answer?" *NW*, Sept. 11, and "Buy that man a Bud" *NW*, Sept. 25) is indeed correct. My colleagues and I know this to be so through the experiences of design, development and test of PU Type 2.1 software in the field.

Three points are reviewed in this letter. First, PU 2.1 nodes at the current level of Systems Network Architecture can optionally support both dependent logical units and independent logical units concurrently. If only independent logical unit support is configured on a PU 2.1 node, a System Services Control Point (SSCP)-to-physical unit session is optionally provided by VTAM and IBM's Network Control Program (NCP) at the node's request. *All* PU 2.1 nodes *must* be activated via an XID Type 3.

When an NCP and VTAM that support PU 2.1 activate a physical unit and that physical unit responds with an XID Type 3, the NCP and VTAM assume the physical unit is a PU 2.1 node, otherwise the physical unit is assumed to be PU 2.0. Evidence of this is given by the VTAM response to the 'DISPLAY NETWORK, ID= puname' command, which displays the node type as 'PU__T2.1' (See VTAM message IST0751).

Second, it is not the ACTPU suppression indicator bit that informs VTAM and NCP that a node is PU 2.1-capable, but rather the receipt of the XID Type 3. The ACTPU suppression indicator bit is set by nodes already assumed to be PU 2.1 to indicate that they

require neither SSCP support for dependent logical units — that is to say, SSCP-to-physical unit sessions — nor for management services — meaning, they will not send or expect to receive alerts or Response Time Monitor requests to or from NetView, a capability that requires the establishment of the SSCP-to-physical unit session.

The field is defined *only* when a Network Name — Control Point

Name vector (X'OE' Type X'F4') is present in the XID Type 3; otherwise it is reserved.

Third, if the Network Name — Control Point Name control vector is not present, VTAM and NCP will forward an ACTPU to the node being activated *by default*, and the ACTPU suppression indicator will *not* be used to determine the PU 2.1 nodes' address space configuration as it relates to the Origin Address and Desti-

nation Address fields present in the transmission header used by PU 2.1 nodes.

All PU 2.1 nodes connected to NCP use XID Type 3 sequences at activation time. How much capability the node actually has depends on how it has been implemented together with its NCP definition. For example, if a PU 2.1 node is to use independent logical unit sessions, the NCP gen for the physical unit must include

logical units with LOCADDR=0

This information was verified through a careful process of research, product design and development, and an extensive system test cycle that included system integration testing with OS/2 Extended Edition Version 1.1, Application System/400 with Advanced Program-to-Program Communications and Advanced Peer-to-Peer Networking and CICS Versions 1.1 and 2.1 execut-

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ing under VTAM Version 3.2.

If Mr. Mohen can come up with an NCP-attached PU 2.1 node that supports independent logical units and does not use an XID Type 3 activation sequence, I'll buy him a beer. If not, I rest my case.

Joseph Rumolo
SNA consultant
Computer Networking
Resources, Inc.
Highlands, N.J.

IBM reveals NetView plan

continued from page 1
announced in the first half of next year and ship late next year, Kapoor said.

When it acquired the DOS-based NetCenter in August, IBM said the move was part of a new corporate strategy to meet customer demands by using third-party vendors to complement its

own development efforts. At the time, analysts said the acquisition signaled that IBM was not close to completing its own graphic interface.

But last week's disclosure put NetCenter in a new light. "I got a very clear sense that the US West product was a stopgap measure," Kapoor said. "IBM made it clear the preferred offering is going to be the OS/2 product they are developing."

The new interface includes an LU 6.2 link to mainframes, said Dean Wolf, a manager at Network Strategies, the network consulting practice of Ernst & Young in Fairfax, Va. Other vendors may be able to use the LU 6.2 link to let NetView consoles support windows into their non-IBM net management systems, he said.

Mark Knittel, systems manager for network management at IBM, declined to say when it

would deliver the graphical interface or whether it will be based on OS/2 Extended Edition and support LU 6.2. Knittel, who gave the network management presentation at the briefing, said IBM understands the requirements for these features.

IBM also told the analysts that NetView would support the Simple Network Management Protocol (SNMP), the protocol used in Transmission Control Protocol/Internet Protocol networks.

John Hunter, director of architecture and telecommunications within IBM's communication systems, declined to detail how or when IBM will ultimately support SNMP but said, "It's a direction that we're headed [in] — to incorporate SNMP into our overall management scheme."

APPN not in sight

Hunter also acknowledged that IBM understands the need for APPN in large SNA nets. "We are certainly looking to learn from the APPN technology and move those types of functions into our large systems products."

But analysts said IBM is a long way from reaching that goal because APPN was designed for minicomputer-based SNA subnets and will require extensive revisions.

"When APPN gets up to a 370 environment, it ain't gonna be APPN," said Frank Dzubeck, president of the Washington, D.C. consultancy Communications Network Architects, Inc. "They're moving [SNA] to a peer structure, but not with APPN constructs. It's going to be something entirely different."

APPN capabilities such as dynamic route selection — based on various factors including priority and failed links — eliminate the need to keep predefined routing tables.

IBM officials declined to give the consultants or *Network World* a timetable for supporting APPN on mainframes.

The key issues in migrating APPN are directory services and routing, said Steve Wendler, program director of office information systems at the Stamford, Conn., consultancy Gartner Group, Inc. "APPN doesn't scale very well to extremely large networks," he said.

The directory search function of APPN produces large amounts of traffic, making it unwieldy for large networks, Wendler said. "For a net of over 800 nodes, you'd probably have more directory traffic than data traffic."

The analysts said IBM officials understand these problems but admitted they are a long way from solving them. "It's not something that's going to happen over the next year or two," Kapoor said.

Analyst estimates of when IBM would support APPN across all processors varied from two to four years, although they all said it would likely be a phased process. □

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GM presses ISDN group for action

continued from page 1

but did not respond to its proposal regarding the interoperability event.

As a result, Schohl said GM will reevaluate its participation in the forum. He declined to say if that means GM might withdraw, but said, "Several major users and vendors may not continue NIU [Forum] participation without an event."

The first action item called for March 1990 publication of the first implementor agreements, which will specify how vendors will implement existing standards to support multivendor ISDN interoperability.

These agreements will be incorporated into the forum's initial ISDN implementation document, to be known as Version 1.

The forum's executive steering committee agreed to that date, and GM agreed to pay for the documents' publication.

Schohl also said GM was satisfied with action taken on another of its requirements — that the interoperability event's technical group assign responsibility for the Version 1 document to expert working groups to expedite its completion.

But the forum's executive steering committee placed a moratorium on all external activities, including the interoperability event, while a recently formed committee reviews the current organizational structure of the NIU Forum (see "Organization of NIU Forum under review," this page).

Schohl said the moratorium would

place the event in limbo, so he relayed a GM proposal that the event be hosted by Southwestern Bell Telephone because of the carrier's leadership role in the forum and its commitment to multivendor ISDN.

"For those people who think a group of us haven't gotten together to bring this [plan] forward, [they're] mistaken," he said. He proposed holding the event at a venue recommended by the Applications, Demonstration and Testing group.

That group approved a motion Wednesday that an "ISDN showcase" be held at the SuperComm '91 conference in Houston, but the steering committee, which must approve the motion, did not consider it.

Shukri Wakid, chairman of the forum's executive steering committee, dismissed GM's plan. "We are in no position to enter into any legal arrangement with South-

western Bell [Telephone] or anyone else. This is a process we want to stay out of."

"The ball's in their court," said Richard Stephenson, district manager for advanced technology with Southwestern Bell Telephone and former chairman of the forum's ISDN Implementors' Workshop. "If we were asked to do something, I'm sure we'd cooperate."

"I feel like I've been used, abused and shoved out the door by people trying to shove this event down our throats," said Scott Beale, chairman of the ISDN Users Workshop's services industries group and senior engineer at Aeronautical Radio, Inc. in Annapolis, Md. When asked if he thought GM might leave the forum, Beale said, "Obviously we don't want that to happen. GM's a big company, but there are other big companies here as well." □

Organization of NIU Forum under review

PHOENIX — A committee reviewing the North American ISDN Users' (NIU) Forum's organizational structure will meet next month to study proposals regarding future oversight of the group.

The NIU Review Committee agreed at last week's NIU Forum meeting here to meet Nov. 16 in Chicago to examine ideas for modifying the group's structure. The committee was formed after a recent meeting of the forum's executive steering committee.

At that meeting, the National Institute of Standards and Technology (NIST), which currently sponsors the forum, expressed concern about its ability to manage the group. NIST said running the forum and accompanying activities has drained its limited financial and personnel resources.

Because of NIST's concerns, the NIU Forum ordered a moratorium on all external activities, including a proposed multivendor ISDN interoperability demonstration, until the review committee issues a recommendation at the group's next meeting, which is scheduled for March in Dallas.

One proposal to be studied by the review committee would turn over control of the forum to a new nonprofit corporation.

Other proposals submitted before Nov. 16 will also be considered, said James Kendrick, head of the ISDN Users' Workshop (IUW).

Several users at an IUW meeting expressed hope that the work of the forum will proceed despite the review.

"What do we do to continue the productivity at the working level?" asked Scott Beale, chairman of the services industries group of the IUW and a senior engineer at Aeronautical Radio, Inc. Beale said he hopes NIST remains a sponsor because it provides the forum with added credibility internationally.

Ian Angus, president of Angus Tele-Management Group, Inc. and assistant vice-gerent of the IUW, warned, "We could very easily mess up what we're doing by creating a structure that prevents us from proceeding."

— Tom Smith



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See the FAXNET Form on Page 75

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Users pleased with demos at ISDN Forum

PHOENIX — Attendees at last week's North American ISDN Users' (NIU) Forum here were generally impressed by application demonstrations but said work remains to make the technology easier to use.

Vendors demonstrated Integrated Services Digital Network applications such as calling line identification, high-speed file exchange, modem pooling, still-video transmission and videoconferencing. US West Communications, Inc. supplied 60 Basic Rate Interface and two Primary Rate Interface lines for 15 vendors.

Basic Rate Interface lines support two B channels carrying voice or data at 64K bit/sec and one 16K bit/sec D signaling channel supporting X.25 data packets. The Primary Rate Interface splits a T-1 circuit into 23 64K bit/sec B channels for voice and data and one 64K bit/sec D signaling channel.

Arya Pathria, manager of US Sprint Communications Co.'s ISDN Prototype Lab, lauded the product demonstrations of several vendors. AT&T Network Systems Group's demonstration of integrated text and video impressed Pathria. In that demonstration, a video camera captured images and transferred them to a local personal computer data base. A remote user then accessed the data base over Basic Rate Interface lines, picking up the video image and text data and displaying the integrated data on his remote personal computer.

Although the applications demonstrated were impressive, in general, the products were too complex for typical end users, according to Daniel Ongg, manager of the data communications department in the Products Development Division of the Institute for Information Industry in Taipei, Taiwan.

Vendors need to overcome technical barriers to make ISDN applications simpler for end users, Ongg said. "All the products technically worked, but the operation needs to be modified," he said. "I'm still impressed because of the technical problems that have been conquered."

Norman Gale, director of Australasian Communication Services, a Victoria, Australia-based consultancy, attended the forum to get a sense of ISDN activity in the U.S.

Gale said the high-speed file exchange application demonstrated by AT&T Network Systems Group could help users "displace or avoid use of local networks in certain office settings."

A demonstration such as the one at the NIU Forum adds momentum to ISDN development efforts, according to David Roth, a consultant with Arthur Andersen & Co.'s Andersen Consulting in Chicago.

"This is basically the only way to lend credibility to ISDN until there's an accepted standard," Roth said. "It's psychology; if users feel they have a part in the process, it will help break down some barriers."

— Tom Smith

New Banyan offering speeds net operations

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files in about half the time it takes using Version 3.0, and the network won't get bogged down as much during peak usage hours," Penzias said.

VINES 4.0 will make it possible for a single 25-MHz, Intel Corp. 80386-based server to comfortably support 70 attached personal computers, Penzias said.

The improved performance will also be important for customers that use X.25 nets to link far-flung local networks, since it can cut monthly transmission costs by as much as 40%, Penzias said.

"If a user pays \$1,000 [per] month for X.25 data transmissions, 60% of the costs are attributable to data transmissions such

as mail messages or file transfers. The remaining 40% is usually due to net overhead; Version 4.0 eliminates overhead."

Customers that use X.25 will also benefit from X.29 terminal-emulation capabilities built into VINES 4.0. The software will enable a VINES server to support as many as 30 terminal sessions with remote mini-computers over a single asynchronous X.25 link. "Instead of having to support 30 separate modems and phone lines, users can now conduct up to 30 concurrent X.29 sessions over a single X.25 link," Petten-gill said.

As expected, VINES 4.0 will make it possible to support four foreign languages — French, Spanish, Italian and German — on a single server ("Banyan upgrades VINES, offers software tool kit," *NW*, Feb. 20). The server can recognize and accept com-

mands in any of the four languages.

"About 40% of our end-user customer base consists of multinational corporations and organizations, and foreign language capability was something they clearly wanted," Penzias said.

The foreign language versions of VINES 4.0 will be available in the first half of 1990. In the long term, Banyan will add support for more languages, as well as enhance the current base by addressing different variations and dialects.

VINES Version 4.0 will also feature four IBM connectivity enhancements. Three of the new features — 3270 physical location security, 3174 terminal controller emulation and source-level routing — will be built into the network operating system. The fourth, token-ring bridging software, will be offered as an option. ■

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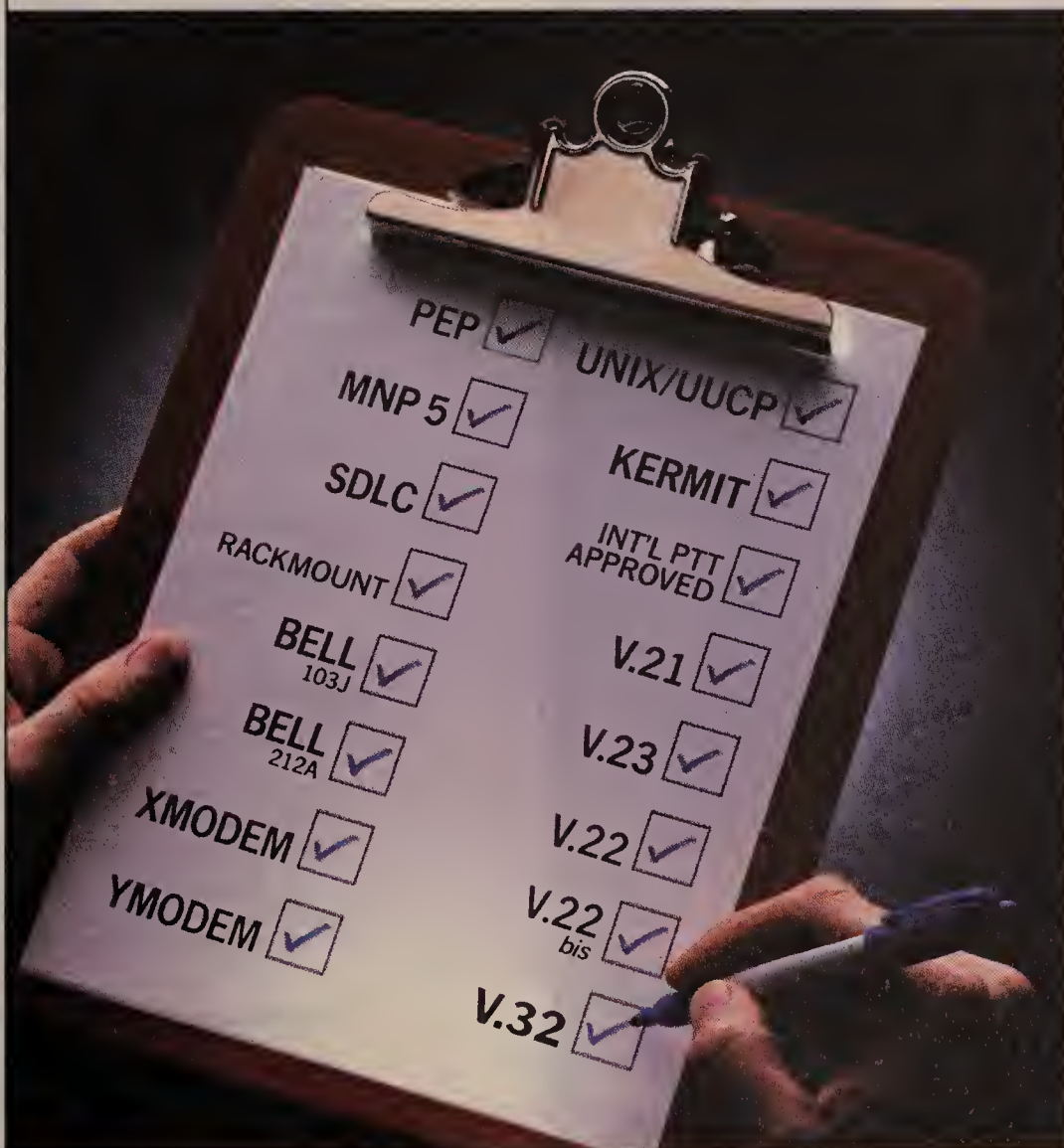
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MCI slaps AT&T with ad suit

continued from page 1

which allows a plaintiff to seek compensation for losses caused by false or deceptive advertising.

Although MCI did not specify the amount of damages sought, the figure could run into hundreds of millions of dollars. MCI wants to be reimbursed for all business lost as a result of the AT&T ads, all profits "wrongfully amassed" by AT&T on the sale of its products during the period, as well as court costs.

AT&T acknowledged last week that it and other carriers have embarked on increasingly negative ad campaigns but insisted there was nothing inaccurate in its ads. "We view the MCI charges to be outrageous and rubbish," said Herb Linnen, an AT&T spokesman. "Just because we're in a competitive situation doesn't mean we will try to attract customers by deceiving them."

Earlier this month, AT&T sent letters to NBC, ABC, CBS and CNN asking the networks to pull MCI ads that it thought were misleading. Linnen said AT&T had informed MCI of its requests and specifically tried to avoid a public brawl over the ads by withholding the letters from the press.

In particular, AT&T was upset

by claims that 100,000 AT&T customers switch to MCI each week and that MCI always saves them money over AT&T prices.

A US Sprint Communications Co. spokesman said US Sprint has no plans to join MCI's lawsuit or file one of its own but "that's always a possibility." US Sprint said it has filed complaints against AT&T with the National Advertising Division (NAD). The NAD is a unit of the Better Business Bureau that regulates the advertising industry and whose decisions are recognized by the courts.

Backfire

Analysts questioned MCI's legal strategy, saying bitter public battles could backfire on the carriers. Charlie Nichols, vice-president with Boston-based Prudential-Bache Securities, Inc., said it is becoming more difficult for customers to believe the carriers, and that confusion could hurt the industry. Negative ad campaigns don't help persuade users to buy more services, he added.

In earlier interviews with *Network World*, users expressed concern about the campaigns. The ads "defeat their own purpose by creating apathy instead of awareness," said Stephen Saks, director of MIS and technical research and development for the California Trucking Associa-

tion. "This mudslinging only results in a lessening of their own value" ("Carriers' ad pitches befuddle prospects," *NW*, Oct. 9).

Likely to turn ugly

At a press conference this week, McGowan also expressed concern that the negative ad campaigns are hurting the industry. He did say, however, that MCI will continue with its lawsuit even though it is likely to turn ugly.

AT&T's actions "are so egregious and the campaign itself so deceptive, we had no choice," he said.

AT&T launched the negative ads "to staunch [sic] the flood of customers who are switching from AT&T to MCI," said McGowan during a press conference. He said he stands behind the MCI ad that states 100,000 AT&T customers are switching to MCI each week.

"In their desperation and their futile attempts to hold onto an eroding customer base, [AT&T has] resorted to lying through deceptive advertising," McGowan said. Claiming that AT&T spends \$1 million per day in advertising, McGowan said his company's reputation could be overwhelmed.

McGowan said the ads have had the most impact on residential and small business users, and the main benefits of winning the

lawsuit would be in those markets. "I believe our survey will show that the very sophisticated customer is not disturbed at all by this. The ones who are [communications] professionals know better," he said.

McGowan said AT&T has run a dozen ads that were false and deceptive. He pointed to an AT&T ad claiming that MCI's facsimile network is 57% more likely than AT&T's to transmit pages that are partially unreadable. This figure, which AT&T said was compiled by AT&T Bell Laboratories, is "ridiculous," according to McGowan.

Another objectionable ad, according to MCI, is one showing the Earth with one-quarter of the globe missing and a caption stating that 45 countries aren't served by AT&T's competitors. Even though MCI is not named in the ad, it is the second largest owner of international facilities, according to the company, and is therefore, a target of the ad, McGowan said.

He acknowledged that there are some places that MCI doesn't serve — citing "a shed in the Antarctic" and Easter Island. But because the portion of the globe that has been cut away in the ad is continental Europe and Asia, it deceptively implies that AT&T's competitors don't serve those areas, he said. □

Calif. PUC opts for rate plan

continued from page 7

lated by the carriers.

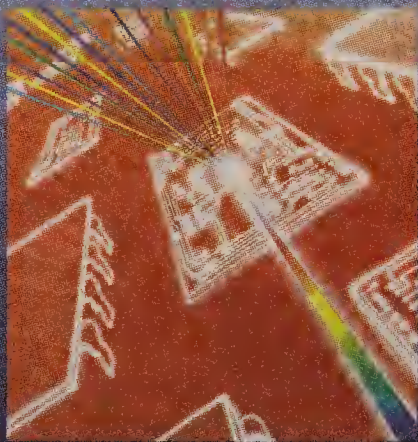
"Since the breakup of AT&T in 1984, it's no longer acceptable to insulate Pacific Bell and GTE California from the efficiencies of a competitive marketplace or to allow ratepayers to be at risk for competitive ventures," said G. Mitchell Wilk, president of the California PUC.

Users who commented on the initial drafts of the incentive plan applauded the final version released last week.

"The commission obviously heeded our comments and that pleases us," said Jerry Appleby, chairman of the board of the Tele-Communications Association, Inc. users group.

The draft plan limited increases in basic phone rates to 4% less than inflation to account for productivity gains by carriers. Users thought that the productivity factor should be higher, somewhere between 4% and 5½%, Appleby said. The final plan raised the factor ½%, which will save California customers hundreds of thousands of dollars, according to Page Montgomery, vice-president of Economics & Technology, Inc., a consulting firm located in Boston. □

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2. Mail subscriptions (paid and/or requested)	70,629	70,941
C. Total paid and/or requested circulation	70,629	70,941
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	6,970	12,383
E. Total distribution (Sum of C and D)	71,127	71,417
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	6,970	12,383
2. Returns from news agents	none	none
G. Total (Sum of E, F1 or 2 — should equal net press run shown in A)	78,097	83,800

I certify that the statements made by me above are correct and complete.

Alice Coronella
Traffic Manager

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How to Use FAXNeT

Listed below in the FAXNeT Directory are the FAX numbers of all advertisements in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

Benefits to the *Network World* Reader

FAXNeT is designed to get you product and service information FAST. And, if your request is urgent and requires an immediate response from the vendor just check the "Urgent" Box.

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NETWORK WORLD

FAXNeT

Attention: Marketing Communications Manager

Subject: This inquiry was generated by a *Network World* reader who is responding via FAX to your advertisement in *Network World*.

Name _____ Title _____

Company/Div _____

Address _____

City _____ State _____ Zip _____

Phone _____ FAX _____

☐ **URGENT**

Action Requested
☐ Request for Sales Call
☐ Request for Proposal
☐ Request for Information

Scope of Purchase Responsibility
☐ Enterprise Wide
☐ Departmental

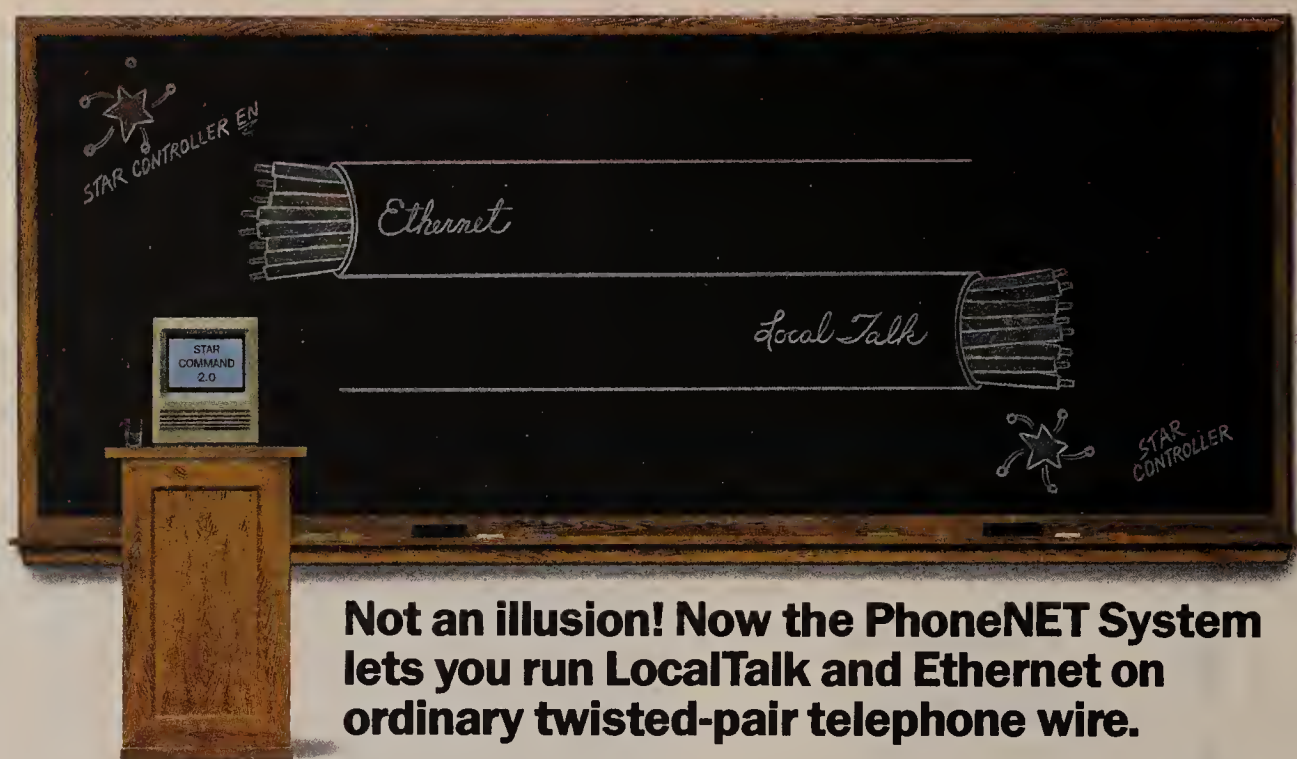
Purchase Timeframe
☐ Within 60 Days
☐ Within Six Months
☐ Within One Year

Purchase Influence/Number of Sites
☐ One Site
☐ 2-9 Sites
☐ 10-20 Sites
☐ 21+ Sites

Product Advertised: _____

Intended Application: _____

Introducing eithernet.



Not an illusion! Now the PhoneNET System lets you run LocalTalk and Ethernet on ordinary twisted-pair telephone wire.

The PhoneNET System just got a lot faster. Farallon's PhoneNET StarController EN and PhoneNET StarConnector EN let you run Ethernet at 10 mbps over ordinary twisted-pair telephone wire.

What's even better, you can combine our Ethernet components with our LocalTalk PhoneNET StarControllers and StarConnectors to create hybrid networks that are reliable, cost-effective, and easy-to-manage.

Imagine, now you can run high-performance Ethernet for people who frequently access a central data base, transfer large graphics files, or operate network-intensive applications such as CAD or desktop publishing. And run low-cost LocalTalk for everyone else. All on the same wiring system.

Running two well-defined standards like Ethernet and LocalTalk also means your network is compatible with Macintoshes and IBM personal computers, NeXT and Sun workstations, laser printers and DEC VAXes. And everything will communicate using popular network software, such as AppleShare, 3Com 3+, TOPS and Novell Netware.

Your future is in the stars.

If you think hybrid networks make sense, here's an even more sensible idea: active star networks over twisted-pair telephone wire.

Stars are the standard for telephone networks, with cables running from the phone closet out to each desk. The PhoneNET System uses this same cabling for your computer network.

Which means if you already have a LocalTalk network using the PhoneNET System, then creating a hybrid LocalTalk/Ethernet network should be easy.

Manage to stay in control with StarCommand 2.0.

Of course, a larger, faster network requires more management power. Our StarControllers have been designed to make it easier and faster to isolate and fix problems without disrupting the network.

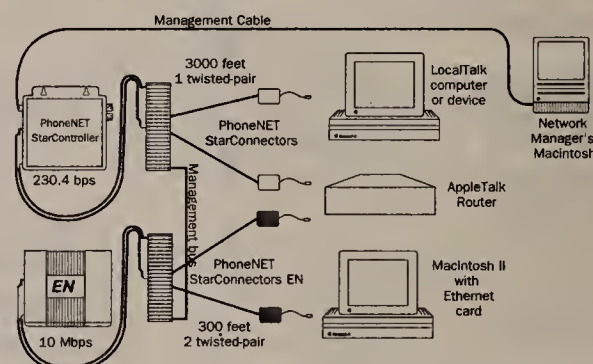
For example, our StarControllers automatically turn off jamming ports on LocalTalk and Ethernet, thus protecting the rest of the network, and turn them back on when the jam clears.

Plus, each StarController comes with StarCommand 2.0 software, which continuously monitors the network and alerts the network manager to any problems. Running under MultiFinder and password-protected, StarCommand will isolate and diagnose problems without

StarController EN:

- Standards: IEEE/CCITT 802.3 Ethernet
- Supports 12 branches of 328 feet each
- AUI interface for connection to coax based Ethernet LANS
- Diagnostic LEDs for power, ROM, RAM, and to indicate packet transmission to each port

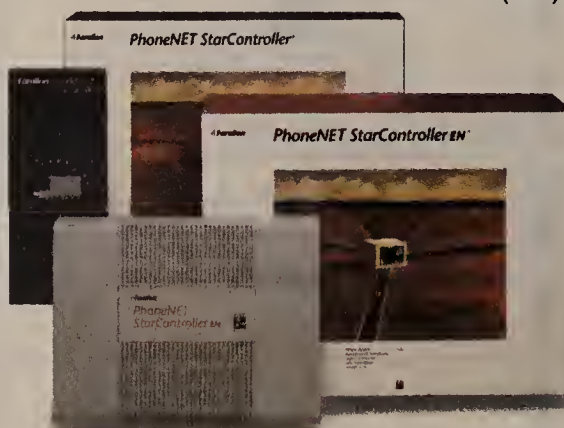
- Interconnect multiple StarControllers EN to support up to 1,024 users



interfering with the rest of the network. And since it works over a dedicated management bus, you can troubleshoot even if the network is down.

You say Ethernet, we say Eithernet.

Look at it this way. Even if you're doing more things on AppleTalk than ever before, chances are, only some of your people are facing critical mass. Everyone else is perfectly happy and productive. So rather than installing Ethernet everywhere, maybe you should consider running both LocalTalk and Ethernet. At the same time. Over the same network cabling. With the PhoneNET System. For more information or technical support, call (415) 849-2331.



PhoneNET System
Look for the PhoneNET System logo when you buy network hardware and software products. It is your best assurance of quality and reliability.

Farallon
2201 Dwight Way, Berkeley, CA 94704

Macintoshes and other devices may require an add-in card. PhoneNET and PhoneNET StarController are registered trademarks, and StarController EN, StarConnector, StarConnector EN, StarController and StarCommand are trademarks of Farallon Computing, Inc. Other brands are trademarks of their respective holders. © 1989 Farallon Computing, Inc.

See the FAXNET Form on Page 75